ECC AutoCAD Electrical Drawing Standards



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10.04.2024



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# JAIL CONTROL ENGINEERING PACKET

## - Formulas

This section provides a comprehensive list of critical variables utilized across the project, including electrical specifications, device classifications, and personnel roles. These variables are systematically organized for integration into dropdown menus on subsequent documentation pages, ensuring consistency and accuracy in data entry and configuration.

## – Overview

The Overview tab serves as a high-level summary of the critical aspects of the project, encompassing key personnel, site information, and essential system details. It provides a concise yet comprehensive snapshot of the project, ensuring that all relevant information about people, places, and technical specifications is readily accessible for quick reference and decision-making.

## - Site Visit Checklist

The Site Visit Checklist is an essential tool for any team member conducting a site visit. The primary objective of this checklist is to gain a preliminary understanding of the existing system's condition and functionality, ensuring it can be integrated into the Imperium system. This checklist is structured to systematically guide the team through a thorough evaluation of the site, beginning with the Jail Control Equipment.

## - Site Visit Notes

The Site Visit Notes tab is designed to be used in conjunction with the Site Visit Checklist, providing a space to document any additional information that may not be covered by the standard checklist items. This section allows team members to capture detailed observations and insights that are crucial for understanding the current state of the system but do not fit neatly into predefined categories.

## - Kickoff Notes

The Kick-off Notes section provides a high-level overview of the project, outlining its objectives, key milestones, and the overall direction. This section serves as an initial guide ensuring alignment on the project’s goals and the path forward. It sets the stage for the detailed technical discussions that follow.

## - Page Numbering

The Page Numbering tab is a structured checklist table designed for tracking the progress of technical drawings within a project. It features three primary columns, each serving a specific purpose to ensure efficient management and organization of the drawings. The page completed column includes a checkbox for each row.

## - BOM

The Bill of Materials (BOM) page tracks all materials required for the project, ensuring comprehensive documentation and that nothing is overlooked. The BOM page includes several key elements. The "On Material List/ICO" column tracks whether an item is already included on the official material list or has been issued for construction (ICO), providing a clear understanding of which items have been ordered or are readily available. The "QTY" column records the quantity of each item required for the project, facilitating efficient inventory management and ordering processes. Each item’s specific part number is listed under the "Part Number" column, ensuring precise identification, which is crucial for ordering and tracking. The "Manufacturer" column identifies the source of each item, which is important for procurement and ensures that only approved or specified products are used. Lastly, the "Description" column provides a detailed explanation of each item, clarifying its function and purpose within the project to aid in accurate selection and application.

## - Cameras

The Cameras tab is an essential component of the project documentation, utilized throughout the project's lifecycle, whether during site visits or while working from the office. This tab is designed to systematically document and manage all details related to the camera systems within the project. The tab captures each camera's name, providing a unique identifier that ensures clear reference throughout the project. Detailed descriptions of each camera's location, function, or specific attributes are also included to aid in precise identification and deployment.

## - Lighting

The Lighting tab is designed to document and manage all details related to the lighting systems within the project, following a similar approach to the Cameras tab. This tab is utilized throughout the project to examine and record critical information about each lighting circuit, ensuring that all aspects are thoroughly assessed and documented. This tab includes fields for the circuit description, which provides a detailed explanation of the specific lighting circuit being assessed. The lighting type, such as LED, fluorescent, or other types, is specified to ensure that the correct technology is identified and managed accordingly. The lighting voltage is recorded to verify the electrical requirements and compatibility with the overall system. Additionally, the circuit amperage is noted, which is essential for understanding the electrical load and ensuring safe operation. The tab also records the existing lighting control location, helping to determine whether the current control setup can be utilized or if modifications are necessary. The lighting control voltage is documented to ensure compatibility with the control systems being implemented. Finally, there is a section for miscellaneous notes, allowing for the inclusion of any additional information or observations that may be relevant to the lighting system.

## - Intercom

This tab includes fields for numbering each intercom station, providing a clear and organized method for tracking multiple units across various locations. Each intercom station is identified by its specific station number, ensuring precise identification and reference during the project. The intercom type, such as "Call-in Station," is recorded to classify the type of intercom being used and its specific function within the system.

## - Door Locks

This tab includes fields for identifying each door by its name, ensuring that each lock is associated with a specific location within the facility. The door lock manufacturer and model number are recorded to provide precise information about the lock, which is essential for maintenance, replacement, or integration with the new system.

## – Access Control

This tab includes fields for identifying each access control item by name, providing a clear and organized method for tracking all components involved in the access control system.

## - Power Requirements

The Power Requirements tab is designed to document and calculate the electrical load for specific racks or panels within the project. This tab records important details such as the function of each circuit, the load in amperes, the required fuse size, and safety calculations. By summarizing these values, the tab helps ensure that the total load is within safe limits and that the correct disconnect size is selected, facilitating accurate and safe power distribution planning.

## - Power Distribution

The Power Distribution tab is used to document and manage the distribution of electrical circuits within the project. It includes fields for overcurrent protection devices (OCPD), circuit ampacity, location, and a detailed description of each branch circuit, both for 120VAC and 24VDC circuits. This tab ensures that all circuits are appropriately protected, correctly rated, and clearly identified, facilitating efficient and safe electrical distribution throughout the system.

## – Input List

The Input List tab is designed to document all PLC inputs and their respective designations within the project. It includes details such as the input address, part number, manufacturer, and location, as well as multiple lines for descriptions. This tab ensures that every input is clearly identified and organized, providing a comprehensive reference for the design and implementation of the PLC system.

## – Output List

The Output List tab is designed to document all PLC outputs and their respective designations within the project. It includes details such as the output address, location, sub-location, and multiple lines for descriptions. This tab ensures that every output is clearly identified and organized, providing a comprehensive reference for the design and implementation of the PLC system's output configuration.

# DRAWING SET-UP

## – AutoCAD Electrical Software Setup

1. AutoCAD Electrical software settings
   1. In the Options Menu:
      1. Open and Save tab
         1. Save as: AutoCAD 2018 drawing (\*.dwg)
         2. Uncheck the “Show Proxy Information Dialog Box”

Graphical user interface, text, application

Description automatically generated

* + 1. Plot and Publish tab
       1. Add your default printer.
       2. Uncheck “Use OLE Application”

Graphical user interface, application

Description automatically generated

* + 1. System tab
       1. Uncheck “Display OLE Text Size Dialog”

Graphical user interface, text, application, email

Description automatically generated

* + 1. Drafting tab
       1. Uncheck “Display Auto Snap Tool tip”
       2. Uncheck all “Auto Track Settings.”

Graphical user interface, application

Description automatically generated

* + 1. 3d Modeling tab
       1. Uncheck “2D Wireframe Visual Style”
       2. Uncheck “All other Visual Styles.”
       3. Uncheck “Display the Viewport Controls”
       4. Open View Cube

Graphical user interface, application

Description automatically generated

* + - 1. Uncheck “Show UCS Menu.”

Graphical user interface

Description automatically generated

* + 1. Selection tab
       1. Uncheck “Object Grouping”

Graphical user interface, text, application

Description automatically generated

* 1. Command Line Settings
     1. FILEDIA – set to 1.

Graphical user interface, text, application

Description automatically generated

* + 1. AEEMXDATAUPDATEMODE – set to 1.

Graphical user interface

Description automatically generated with low confidence

* 1. Snap to Drawing Grid Settings
     1. Snap X Spacing – 0.125
     2. Snap Y Spacing - 0.125
     3. Grid X Spacing - 0.25
     4. Grid Y Spacing – 0.25
     5. Major Line Every - 2

Graphical user interface, application

Description automatically generated

1. Default Project Properties
   1. Components tab
      1. Tag format - %F%N
      2. Click Suffix Setup

Graphical user interface, text, application, email

Description automatically generated

* + 1. Select top set-up option.

Graphical user interface, text, application

Description automatically generated

* 1. Wire numbers tab
     1. Format - %N
     2. Select “Above Wire”
     3. Select “Centered”
     4. Click Suffix Set-up

Graphical user interface

Description automatically generated

* + 1. Select 3rd option.

Graphical user interface, application

Description automatically generated

* 1. Cross References tab
     1. Same Drawing and Between Drawings - %N

Graphical user interface, text, application, email

Description automatically generated

* 1. Drawing Format tab
     1. Spacing – 1.0
     2. Width – 11
     3. Multi-wire spacing – 0.5
     4. Select Reference numbers
     5. Click Set-up

Graphical user interface, application

Description automatically generated

* + 1. Select “Numbers only”

Graphical user interface, application

Description automatically generated

## – ACADE Project Set-up and Start

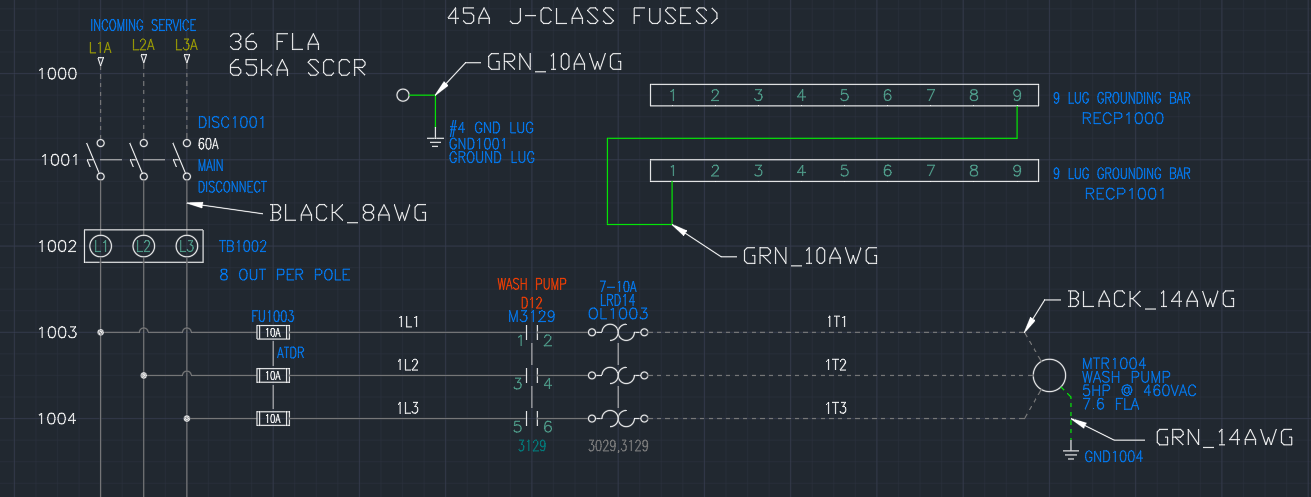
## The project setup documentation can be found by clicking [here](https://tcathcart33.github.io/AutoCad-Electrical-Setup/AUTOCAD_ELECTRICAL_PROJECT_CREATION_DIRECTIONS.pdf).

## – ACADE Page Numbering Details

1. **Reference (000)** serves as the foundational category, containing critical information such as the list of page numbers and the project name, providing a reference point for the entire documentation set.
2. **Floor Plan (Pages 100-199)** encompasses detailed layout plans, utilizing ECC component designations to pinpoint exact locations, wire runs, and other essential elements. These components utilized are door locks and contacts, intercoms, cameras, access control and special details.
3. **Network (Pages 200-299)** is dedicated to one-line layouts of network devices, such as encoders, decoders, computers, PLCS, and other control devices connected by standard Cat6 cables. This outlines the structure of the network, detailing how various devices communicate and control different operations within the system.
4. **Intercom (Pages 300-399)** focuses on one-line diagrams that map out all intercom connections, both new installations and existing systems. This category ensures that all communication lines are clearly documented, facilitating easy troubleshooting and future expansions.
5. **Video (Pages 400-499)** is reserved for one-line diagrams of video interface systems, including both new installations and existing setups. This category details the connections and configurations necessary for the video systems to operate seamlessly.
6. **Panel/Rack Layouts (Pages 500-599)** offers a detailed depiction of all jobs rack and panel layouts as well as their locations in the given building. These racks include
   1. Main Jail Control Rack (JCR-1) – Network, Intercom, and Video devices housing.
   2. Main Jail Control Enclosure (JCE-1) – Door and Utility control PLC panels
   3. All remote racks or enclosures
7. **Terminal Block Details (Pages 600-699)** provides an intricate description of how wires are routed between components, and wire routings from panels to the field devices.
8. **AC Distribution (Pages 700-799)** involves schematic diagrams that depict the distribution of AC power to various components and wires. These diagrams may include details on the existing power supplies or new, typically ranging from 120V to 240V.
9. **DC Distribution (Pages 800-899)** like the AC Distribution, focuses on schematic diagrams but for DC power components. This often includes the stepping down of voltage to 24V, detailing how DC power is distributed throughout the system.
10. **PLC (Pages 900-999)** covers the schematics and descriptions of devices controlled by a Programmable Logic Controller (PLC). This category includes detailed labeling of inputs and outputs for each device, providing a comprehensive overview of the control systems in place.

## Schematic Standards

1. Schematic Standards
   1. Power Schematics – Dimensions below are accounted for in the template drawings.
      1. Each of the following common components shall be placed on the Line of the first 3-phase page as designated below.
         1. Incoming Service Arrows – Line 00
         2. Ground Bar – Line 00 – 5.5” from the 3-phase power rung
         3. Main Disconnect – Line 01
         4. Power Distribution Block – Line 02
         5. Ground Lug – Line 01 – 3.5” from the 3-phase power rung
      2. Each L1 of each new branch circuit shall be located directly on the rung number.
      3. Do not overcrowd circuits onto a page, be sure to leave sufficient room between components and branches for easy readability.
      4. Wire color and gauge will be noted on each branch circuit.
      5. The overcurrent protective device shall be the first component in any branch circuit and located 1” from the L3 main rung line.
      6. The control device, I.E. Contactor/OL or VFD, shall be 3” from the overcurrent protective device.
      7. The Power transmission device shall be 3” from the control device.



* 1. Control Power Schematics
     1. Signal arrows shall be located on line 00, referencing the power circuit that feeds the transformer/power supply.
     2. The Transformer/Power Supply shall be located on Line 002.
     3. All subsequent branch circuits must be located directly on a rung number.
     4. The first major device, I.E. Overcurrent Protective devices, Contacts, Switches; shall be located 1” from the power rung.
     5. All Major components must have at least 1.5” of space between each other major component in that branch circuit.
     6. All supporting components, I.E., terminal blocks; can be located in between all major components. Arranged to ensure overall neatness and readability of the schematic.
     7. Relay coils of each circuit shall be placed so that they are 1.5” from the Neutral / or DC COM power rung, leaving room for other connections or O/L contact.
     8. All rungs shall have attributes 0.25” outside the Neutral or DC COM power rung with a description of the circuit on that line.
     9. No devices shall be placed directly on the vertical rungs of the page. All devices must be placed horizontally on the schematic.
  2. PLC Schematics.
     1. The PLC template drawing has targets for input and output PLC card types. The PLC cards shall be placed on the targets provided on the PLC template drawing. The targets are on a layer that can be turned off once the card has been placed.
     2. The PLC template drawing also includes a text layer that reads “SPACE INTENTIONALLY LEFT BLANK” on each ladder section. This layer can be turned on and off as needed.
     3. The Module Layout Spacing shall be set at 1.0.
     4. Terminal Blocks for the I/O wiring shall be located 1.5” from the card edge.
     5. Components shall be staggered on each line of the PLC card to allow room for the description of each component.
     6. All terminals/fuses connecting to the rung for each input point shall be located 1.5” from the rung, if required.
     7. Each PLC schematic page shall have no more than 1 PLC card, per ladder for 16PT or more I/O Cards. Or 2 PLC cards with 8PT I/O cards.

## -

## - Drawing Scale

ECC standard scales for floor plan layouts are:

1/16” = 1’-0”

3/32” = 1’-0”

1/8” = 1’-0”

Ensure graphical scale, title block scale, and viewport scale are the same.

ECC standard scale for details is:

1:8

If floor plans are not shown on sheet, graphical scale will be removed. There may be sheets where a scale is not used at all. Indicate this with NTS in the title block.

## - Key Plans

Key plans are to be used if the entire floor plan is not shown on the page. Show the area of work with a magenta-colored hatch-filled polyline that represents the boundaries of the viewport. When the head-end location is on a different level, outside of the area of work, an additional key plan would be used on the first sheet of the drawing. Show the head-end location(s) with a leader pointing to the specific room. If the floor plans are split into multiple areas and utilize match lines, the match lines shall also be shown on the key plan with 1/8” text identifying the area. When creating a key plan, isolate the floor plan layer and copy entire floor plan to the side. Scale the entire copied floor plan down to .001. Cut and paste the scaled floor plan as a block on the desired sheet. Key plans should not be created by using a viewport.

## - Match Lines

Match lines are used to denote a cut line between two or more areas. Text is placed around the outside edge of the match line to indicate the area to be matched. Match lines are to be on their own layer, using hidden line type, 0.5 thickness, 1/8” paper text height.

## - Text Sizing

Text size is dictated by drawing scale. ECC standard text sizes are 1/16”, 3/32”, and 1/8”. Based on the drawing scale:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1/8” = 1’-0” | | 3/32” = 1’0” | | 1/16” = 1’-0” | |
| Paper | Model | Paper | Model | Paper | Model |
| 1/8” | 12” | 1/8” | 16” | 1/8” | 24” |
| 3/32” | 9” | 3/32” | 12” | 3/32” | 18” |
| 1/16” | 6” | 1/16” | 9” | 1/16” | 12” |

## - Text Styles

ECC uses text style “standard” for all text, excluding: floor plan, detail, and key plan headings which uses “style 1”. These styles are to be used for all text in a given ACADE project to ensure smooth integration with field wires object character recognition.

*Standard = Microsoft Yi Baiti Style 1 = Calibri Light*

## - Layer Creation / Naming

ECC Standard layers are created from the drawing clean-up / TRANS command. Additional standard layers can be brought into the drawing by using the command MYLAYER. Refer to section 2.13 for ECC Standard Layers. Additional layers for symbols, notes, cabling, etc. shall be formatted with the project number followed by the type of system. System type is not to be abbreviated in layer names. (*Ex. 100336 JAIL CONTROL).*

## - System Layer Colors

ECC defined layer colors are to be used when possible. Existing system layer colors shall not be similar to new system layer colors. Existing system device attribute should stay consistent with existing system symbol color. Refer to section 2.13 for ECC Standard Layers.

## - ECC Standard Layers

|  |  |  |
| --- | --- | --- |
| Layer Name | Layer Color and ACI | Notes |
| Jail Control | Purple - 204 |  |
| Area of Work | Magenta - 6 | Hidden line type, 0.5 line weight  If system color is Magenta, use Green - 3 |
| -Audio | Red - 1 |  |
| Audio-Visual | Blue - 5 |  |
| Ceiling | Grey – 9 |  |
| -Control | Purple – 204 |  |
| -Data | Orange Brown - 34 |  |
| Defpoints | Cyan - 5 | Defpoints should **never** be frozen or  turned off |
| DESC | Blue - 150 | Component Tags |
| DESCCHILD | Orange - 20 | Description of Components |
| Door Tag | Dark Brown – 46 | Color can be changed depending on  project situation |
| --Drafting Notes | Magenta - 6 |  |
| Floor Plan | Brown – 23 |  |
| Furniture | Light Brown - 42 |  |
| Intercom | Blue – 5 |  |
| LOC | Grey - 8 | Location Indicator |
| Match line | Black (White) - 7 | Hidden line type, 0.5 line weight |
| Misc | Grey – 253 |  |
| -Network | Green – 96 |  |
| Paging / Public Address | Blue – 5 |  |
| Rev Cloud# | Orange – 30 |  |
| Room Tag | Dark Brown – 46 | 9” typically |
| Rung Numbers | Purple - 190 |  |
| Security | Purple – 204 |  |
| Sheet Notes | Black (White) - 7 |  |
| Sound | Blue – 5 |  |
| -Video | Blue – 5 |  |
| Viewports | Blue – 5 | No Plot |
| Video Surveillance | Magenta - 6 |  |

# MODEL AND PAPER SPACE CONSIDERATIONS

## - Model Space

Floor plans, notes associated with floor plans, one-line diagrams, and plate details should be in model space. Draw a boundary around anything other than the floor plans to ensure these items are easily located. Doing this ensures all pertinent project information is in one place and can be easily copied for future projects.

## - Paper Space

Device/cable legends, details, general/sheet notes, key plan, site plan, title block should be in paper space.

# LEGENDS / DETAILS / BLOCKS / NOTES

## - Device Legend

Utilize tool palette blocks to create the device legend. This includes the top and bottom legend headings. Legends should flow consistently with head-end devices at the top and like symbols grouped together. All device symbols being shown on the floor plans must be shown in the legend. If utilizing an area of work border/outline, only the devices that are inside of the area of work need to be in the legend. Existing re-installed/relocated legend items need to be grouped together below any new equipment utilizing a blank legend box and a re- installed/relocated heading box. Existing legend items use the same format as re-installed/relocated and are the last grouped legend items. Legend blocks should utilize the standard system layers without referencing project numbers.

## - Cable Legend

Utilize tool palette blocks to create the cable legend. This includes the top and bottom legend headings. Cable legends should flow alphabetically based on cable letter designation.

## - Details

ECC utilizes standard details in all drawings when applicable. These standard details are found in the tool palette in AutoCAD. Additional ECC details can be found by using the AWWT program, also found in AutoCAD. Search AWWT to ensure that the most updated details are being used on new drawings. Detail heading text size shall always be 1/8” and style 1 text. When working on a fire alarm project, use lisp command *IB* to pull in details associated with legend blocks. Detail blocks should utilize the standard system layers without referencing project numbers.

## - Standard Block Structure

ECC standard blocks shall be uniform and consistent. The blocks need to have proper connection types shown as well as connection points. Connection points shall be spaced at a minimum of 3/16”. Device model numbers shall be *Style 1* text style utilizing 3/32” text and connection call outs shall be *Standard* text style utilizing 1/16” text.

# VIEWPORTS / SHEET SIZES

## - Types of Viewports (Regular Vs Polygonal)

Viewports are generally rectangular, however in certain situations a polygonal viewport will be required. Polygonal viewports will be useful when floor plans are irregular to utilize sheet space effectively.

## - Scaling A Viewport

Depending on the content in the viewport, the scale will vary. Floor plan viewports must match the identified scale in the title block and the scale bar accordingly. One-line viewports will typically be scaled at 1:1. The scale bar will not be present and the identified scale in the title block shall read NTS. Rack layout viewports and speaker rigging viewports will be scaled at 1:8. The scale of rack viewports or speaker rigging viewports is not indicated in the title block. Plate detail viewports will typically be scaled at 1:1. If the plate detail is too large to fit on a standard sheet with 1:1 scale, the scale can be set at 1:2, but no smaller. The scale bar will not be present and the identified scale in the title block is dictated by content on sheet. Floor plan viewports take precedence in the identified scale in the title block and scale bar, if present.

## - Multiple Viewports – Key Plan Layout

If multiple viewports for a single level are required on a sheet, they must be identified with a key plan. The viewport layer should be changed to 0. A line should also connect the viewport to the hatch of the key plan. If multiple levels are to be shown on the same sheet, each viewport boundary must have a corresponding key plan with indication of level in heading.

## - Standard Sheet Sizes

ECC standard page sizes include:

(Arch B) – 11 x 17

(Arch C) – 18 x 24

(Arch D) – 24 x 36

(Arch E) – 30 x 42

# POST-ENGINEERING REVIEW

## - Drafter Check (Detail Size, Layout Changes, Etc.)

Upon completion of project, the drafter will perform a high-level review to ensure the drawing meets ECC’s CAD standards. Some of the common standards to verify include: text sizes, proper layer usage, complete and accurate legends, consistent line breaks, etc.

## - Saving to Q360

After drafter check of CAD standards, drafter to print drawing to PDF format. PDF should be saved in project’s *DOCUMENTS* folder in Autodesk Docs. PDF should be named in a specific format which identifies the project number, the system abbreviation, followed by drawing. *(Ex. 100456 SR DRAWING).* PDF then must be uploaded to the documents tab of corresponding project in Q360. The category of *Engineering* and sub category of *Drawings* must be selected.

## - Uploading to Fieldwire

Upload the pdf to the corresponding system folder inside the Fieldwire project (To create PDF see 9.2). Once the PDF has been uploaded and processed, select all pages and run the “*Scan number/description*” action under the Actions pull down. Resize the Description and Page Number boxes to ONLY highlight the “Area” and “Sheet Number” information on the page. Be sure to expand the Description box large enough to encompass possible longer “Area” descriptions on the proceeding pages. Confirm Fieldwire has scanned the information correctly. If Tasks are required on the project, please refer to page 9 of the “*Fieldwire Operational Procedures Document*” located in the “*PAGE LAYOUT-HELP DOCS”* Tool palette. Once PDF’s are uploaded and/or Tasks are created, go to settings and turn on both Notification settings for “Send email when tasks are created or updated” and “Send email when plans have a new version or markups”.

# REVISIONS

## - Drawing Changes

Revisions are changes to the drawing after initial engineering is complete. These typically happen after a project has been submitted. Drawing revisions ensure that the drawings are as accurate and up to date as possible.

When a revision is issued, the project title block shall indicate the revision number and date completed. The drafting technician and system engineer work collaboratively to issue these drawing changes.

## - Revision Annotation

Creating these drawing changes requires indication of such change. All changes need to be clearly shown within the ACADE title block.

## - Saving to Q360

Drafter to print drawing to PDF format. PDF should be saved in project’s *DOCUMENTS* folder in Autodesk Docs. PDF should be named in a specific format which identifies the project number, the system abbreviation, followed by drawing and REV number*. (Ex. 100456 SR DRAWING – REV.1).* PDF then must be uploaded to the documents tab of corresponding project in Q360. The category of *Engineering* and sub category of *Drawings* must be selected.

## - Uploading to Fieldwire

Upload the pdf to the corresponding system folder inside the Fieldwire project (To create PDF see 10.3). Once the PDF has been uploaded resolve the sheet version conflict to upload the PDF as a new version. If Fieldwire doesn’t recognize the sheet numbers, select all pages and run the “*Scan number/description*” action under the Actions pull down. Resize the Description and Page Number boxes to ONLY highlight the “Area” and “Sheet Number” information on the page. Be sure to expand the Description box large enough to encompass possible longer “Area” descriptions on the proceeding pages. Confirm each page as new version. If the project has Tasks, the engineer will update any device task changes.

# XREFS

## - When to Create XREF

XREFs should be created when multiple system types and/or projects need to be shown on a centralized drawing, or for linking a singular floor plan to the sequential 100 series pages. Creating the XREF simplifies floor plan changes and ensures that once as-builts are complete, system changes are accurately reflected on previous and future projects. ECC utilizes project and site XREFs, thus it is important to determine the correct type needed for each project.

## - Project XREF

Project XREFs are used when a new site has multiple systems being installed at the same time. The project XREF is created during the initial drafting phase. Project XREFs will turn into site XREFs after three or more projects have been added to the site. Using an existing project XREF should only be done if the previous projects have the as-built changes complete.

## - XREF Considerations

When working with XREFs, there are several considerations to keep in mind. Before an XREF is created, it should be verified that an existing XREF for this site does not exist. When creating an XREF from scratch, the drawing needs to be saved with the site name followed by XREF. *(Ex. TERMINAL BUILDING XREF).* Best practice on site XREFs would be to create page layouts that encompass the entire site’s floor plans. These page layouts as well as the title block page number should be named XREF and the page number associated with it. *(Ex. XREF-1, XREF- 2).* There should be no reference to existing device call outs, revision clouds, area of work call outs, etc. in an XREF. These annotations need to be located in their respective drawing.

## - Changes to Existing XREF

When a project requires an existing XREF be utilized, before any changes are made, a copy of the XREF needs to be created and placed into “OLD XREFS” folder. There needs to be a sub folder created within “OLD XREFS” which should be named using the last project number and the date of the copy. *(Ex. 100429 – 09-16-21).* Utilize the layer properties manager to determine the last project number.

# AS-BUILTS

## - Drawing Changes

As-builts from field changes shall be updated on the project drawing. Drafting will scan all marked up as-builts to the project sub-folder on server. This sub-folder will need to be created in the main project folder labeled “SCANNED AS-BUILTS”. Drafting will update drawing per as-built changes. When an as-built is complete, the project title block shall indicate the completion date. System engineer will review drawing changes for accuracy. Once reviewed, if project is a site XREF, bind and insert the XREF into the drawing. Once bound, a 1/8” (sizes C, D, & E) or a 3/32” (size 11x17) note on DEFPOINTS layer shall be placed under the most recent as-built date on the first page. The note shall read “XREF BINDED”

## - As-Built Standard Practices

\*\*\*Standard practices for as-built process will be forthcoming.

## - Saving to Q360

Drafter to print drawing to PDF format. PDF should be saved in project documents folder on the server. PDF should be named in a specific format which identifies the project number, the system abbreviation, followed by as-built drawing. *(Ex. 100456 SR AS-BUILT DRAWING).* PDF then must be uploaded to the documents tab of corresponding project in Q360. The category of *Engineering* and sub category of *As-Builts* must be selected.

# FOLDER ORGANIZATION

## - Project Folder Structure & Naming

At the onset of a project, the project folder needs to be created utilizing the project number and name. *(Ex. 100889 ENGLEWOOD MEDICAL BUILDING).* If multiple projects are linked to the same site, the project folder will consist of all projects linked. *(Ex. 100781 – 100782 – 100783 BLUE VALLEY NORTHWEST HIGH SCHOOL).* Sub folders are created for project specific files. These folders should only be created when needed and no folders should be left empty. Standard ECC folders consist of *“ADDENDUMS, AE CAD, AE PDF, DOCUMENTS, SCANNED AE PDF, SCANNED AS-BUILTS, AND SPECS”.* The documents sub folder should stay as organized as possible by creating additional folders for items such as site pictures, battery calcs, etc. The relevant CAD file should be the only item left outside of a sub folder.

# ABBREVIATIONS

|  |  |  |  |
| --- | --- | --- | --- |
| Abbreviation | Definition | Abbreviation | Definition |
| AC | Access Control | PE | Professional Engineer |
| ACC | Access Control Cabinet | PM | Project Manager |
| ACI | AutoCAD Color Index | Q360 | Solutions 360 |
| A/E | Architect - Engineer | REV | Revision |
| AFF | Above Finish Floor | RTLS | Real Time Locating System (IR Tracking) |
| AHJ | Authority Having Jurisdiction | SC | Structured Cabling |
| AHU | Air Handling Unit | SDR | Sound Rack |
| ANN | Annunciator | SM | Sound Masking |
| AR | Area of Rescue/Refuge | SOW | Scope of Work |
| AV | Audio Visual | SR | Sound Reinforcement |
| AWWT | And Where Was That?  (CAD Program) | SS | Security |
| BDA | Bi-Directional Antenna | STE | Suite |
| BP | Button Panel | TSM | Technical Service Manager |
| CAC | Cellular Alarm  Communicator | TE | Telephone Entry |
| CB | Code Blue | VS | Video Surveillance |
| CD | Candela | XREF | External Reference |
| CCO | Customer Change Order |  |  |
| CL | Clock |  |  |
| CS | Cable System |  |  |
| DAS | Distributed Antenna System |  |  |
| DE | Door Entry |  |  |
| DOAS | Direct Outside Air Supply |  |  |
| DPS | Door Position Switch |  |  |
| EOL | End of Line / End of Life |  |  |
| ER | ERRCS – Emergency Responder Radio Coverage  System (BDA, DAS) |  |  |
| FA | Fire Alarm |  |  |
| FAA | Fire Alarm Annunciator |  |  |
| FACP | Fire Alarm Control Panel |  |  |
| FM | Fire Marshal |  |  |
| GF | General Foreman |  |  |
| IC | Intercom |  |  |
| ICO | Internal Change Order |  |  |
| IS | Infant Security |  |  |
| JC | Jail Control |  |  |
| KP | Keypad |  |  |
| MUA | Make-up Air Unit |  |  |
| NAC | Notification Appliance  Circuit |  |  |
| NC | Nurse Call |  |  |
| NTS | Not to Scale |  |  |
| PA | Public Address |  |  |
| PB | Push Button |  |  |
| PC | Project Coordinator |  |  |

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| --- | --- | --- | --- |
| Abbreviation | Definition | Abbreviation | Definition |
| **Sales** | | **Project Management** | |
| AJG | Anthony Goana | AB | Andrew Bolin (LN) |
| CSC | Craig Copas | JB | Janna Baker (LN) |
| DL | Dalton Lane | JM | Jason Monroe (LN) |
| DDT | Dan Throener | JMB | Joe Bullock (LN) |
| DSB | Dan Balsinger | TG | Taylor Graham (LN) |
| GJS | Greg Scott | JK | Joseph Keeton (OM) |
| JKA | Jan Aden | LE | Laura Evans (OM) |
| JWJ | Jere Jimerson | MB | Melissa Birkel (OM) |
| JPH | John Hanrahan | TB | Tia Barr (KC) |
| KAL | Katrina Larson | JS | Janet Seacreas (KC) |
| GLH | Logan Hinnant | CB | Craig Betzen (WI) |
| MBA | Mark Allen | LL | Leah Logan (WI) |
| MPE | Michael Eager | DH | Dean Hinnant (SP) |
| NLH | Nick Hutton | SR | Spencer Rotton (SP) |
| SW | Shane Warren |  |  |
| SEL | Scott Lord |  |  |
| SF | Steve Franks |  |  |
| WAT | Wil Toler |  |  |
|  |  |  |  |
| **Estimating** | | **Technical Service Manager (TSM)** | |
| KC ECC | Kansas City House Account | Lincoln | Donna Urbanec |
| LN ECC | Lincoln House Account | Omaha | Joel Stolley |
| OM ECC | Omaha House Account | Kansas City | Greg Pippin |
| SP ECC | Springfield House Account | Springfield | Seth Weig |
| WI ECC | Wichita House Account | Wichita | Craig Betzen |
|  |  |  |  |
| **Engineering** | | **Programming** | |
| AVDL | AV Design Labs | JJ | Justin Jiskra |
| BRO | Brad Oberg | JS | Jeremy Skeels |
| BG | Brett Graverholt | KR | Kyle Robinson |
| CLC | Carrie Chartier | MK | Matt Kubes |
| CMJ | Chase Jacobson | TH | Thomas Huber |
| DB | Darwin Brandt |  |  |
| JBW | Jarrod Workman |  |  |
| RDT | Rory Thelen |  |  |
| RC | Ryan Chab |  |  |
| TCS | Tim Steinhauer |  |  |
| GD | Gregory DuBuque |  |  |
| TC | Trenton Cathcart |  |  |

# LISP DEFINITIONS / COMMANDS

|  |  |
| --- | --- |
| **Layer Commands** | |
| Command | Function |
| ABD | Places selected objects on “AS-BUILT DELETED” layer |
| ASB | Adds the layer “AS-BUILT DELETED” |
| AOW | Adds the layer “AREA OF WORK” |
| AUDIO | Creates all one-line cable layers for audio-visual projects |
| FIRE | Changes all XREF layers associated with fire alarm to the color (5) blue |
| LAYAV | Thaws/turns on all audio-visual layers (including XREF layers) and turns off all other  system layers |
| LAYCL | Thaws/turns on all clock layers (including XREF layers) and turns off all other system  layers |
| LAYF | Thaws/turns on all fire alarm layers (including XREF layers) and turns off all other  system layers |
| LAYIR | Thaws/turns on all IR tracking layers (including XREF layers) and turns off all other  system layers |
| LAYNC | Thaws/turns on all nurse call layers (including XREF layers) and turns off all other  system layers |
| LAYP | Thaws/turns on all paging/intercom layers (including XREF layers) and turns off all  other system layers |
| ML | Adds the layer “MATCH LINE” |
| MYLAYER | Creates all ECC default layers |
| NURSE | Changes all XREF layers associated with nurse call to the color (3) lime green |
| SOUND | Changes all XREF layers associated with sound/intercom/paging to the color (4) cyan |
| THAW | Thaws/turns on all layers (except frozen AE, As-built, or grid line layers) |
| TRANS | Translates AE layers to ECC default layers |
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| **Object Layer Commands (typically set up as keyboard macros)** | |
| Command | Function |
| AECLOCK | Changes selected objects to AE CLOCK layer |
| AEFIREALARM | Changes selected objects to AE FIRE ALARM layer |
| AENURSECALL | Changes selected objects to AE NURSE CALL layer |
| AESECURITY | Changes selected objects to AE SECURITY layer |
| AESOUND | Changes selected objects to AE SOUND layer |
| CELING1 | Changes selected objects to CEILING layer |
| CLOCK1 | Changes selected objects to CLOCK layer |
| FLOORPLAN1 | Changes selected objects to FLOOR PLAN layer |
| FURNITURE1 | Changes selected objects to FURNITURE layer |
| MISC1 | Changes selected objects to MISC layer |
| NURSECALL1 | Changes selected objects to NURSE CALL layer |
| REVCLOUD1 | Changes selected objects to REV CLOUD layer |
| ROOMTAG1 | Changes selected objects to ROOM TAG layer |
| ZERO | Changes selected objects to “0” (zero) layer |
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| **Audio-Visual Specific Object Layer Commands (typically set up as keyboard macros)** | |
| Command | Function |
| AUDIO1 | Changes the selected objects to -AUDIO layer |
| CONTROL1 | Changes the selected objects to the -CONTROL layer |
| DATA1 | Changes the selected objects to the -DATA layer |
| NETWORK1 | Changes the selected objects to the -NETWORK layer |
| VIDEO1 | Changes the selected objects to the -VIDEO layer |
|  |  |
| **Object Edits, Object Creation, Object Property Commands** | |
| Command | Function |
| ATTCOLOR | Changes attributes color by clicking on each attribute |
| BRKLH | Breaks horizontal lines with a 1/16” gap |
| BRKLH6 | Breaks horizontal lines with a 6” gap |
| BRKLH32 | Breaks horizontal lines with a 3/32” gap |
| BRKLV | Breaks vertical lines with a 1/16” gap |
| BRKLV6 | Breaks vertical lines with a 6” gap |
| BRKLV32 | Breaks vertical lines with a 3/32” gap |
| DDCHTEXT | Change attribute properties |
| IB | Insert fire alarm, nurse call, or audio-visual details from a legend block |
| INCATT | Numbers the devices in sequential order using a blocks attribute. Used to address  devices or change cable labels in sequential order |
| R4 | Creates a polyline that will fillet the corners of the lines with a specified radius |
| TEXTMC | Text command that center aligns the text with predefined text height that is specified (STANDARD text style) – Used typically for one-line cables / floor plan cable  labels |
| TEXTMC1 | Text command that center aligns the text with predefined text height that is specified (STYLE1 text style) – Used typically for floor plan / detail headings / and  one-line block headings. |
| TLEN | Calculates the total length of selected polylines. |
| XRR | Reloads XREF(s) and reconciles the layer |
|  |  |
| **Page Layout Commands** | |
| Command | Function |
| GATTE2 | Changes title block attributes by selecting certain page layouts |
| QVLAYOUT | View all page layout tabs at once |
| TABSORT | Re-orders tabs alphabetically |
| VPF | Freezes viewport layers per system |
| ZEA | Zoom extents all page layouts, purges blocks and layers, and saves drawing |
| **Helpful Commands / Tips & Tricks Commands** | |
| Command | Function |
| ATTREQ | Turns off attribute box when inserting a block from the tool palette |
| ATTSYNC | Updates block attributes |
| AUDIT | Fixes drawing errors |
| BATTMAN | Allows user to re-order attributes |
| COMPARE | Compare differences between 2 drawings |
| CTRL + R | Cycles between view ports |
| LAYER | Freeze or thaw a specific layer. Type LAYER (enter) F (for freeze) (enter) \*FIRE  ALARM\* (layer name) (enter twice) |
| PEDITACCEPT | Removes “Do you want to make a poly line” from PEDIT command |
| TCASE | Changes text objects to be all uppercase, lowercase, title case, or sentence case |
| TEXTALIGN | Aligns different text in a line |

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| --- | --- |
| TEXTALLCAPS | Forces CAD to utilize all CAPS (except attribute editor) |
| TJUST | Sets justification of any selected DTEXT or MTEXT without moving text object |
| TORIENT | Makes un-readable text, more readable |
| USCDETECT | Fixes curser jumpiness |
| VPLAYER | Freeze or thaw a specific layer in current or all viewports. Type VPLAYER (enter) F (for  freeze) (enter) \*FIRE ALARM\*(layer name) C (C for current, A for all) (enter twice) |
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| Hold CTRL and double click on an attribute to change that specific attribute | |
| If text mask doesn’t work – ALT+SHIFT+A and then PICKSTYLE=1 | |
| For line types (hidden/dash/etc) to view correctly by scale – change the following variables:  MSLTSCALE=1, PSLTSCALE=1, LTSCALE=1 | |
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# APPENDIX DRAWINGS

Appendix drawings will be forthcoming in a future revision.

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