

Drawing Cleanup and Quality Control for Drawings in Civil 3D

Examine tools to ensure CADD drawings in AutoCAD Civil 3D are Clean and Useable

FDOT State Kit for AutoCAD Civil 3D 2014



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Drawing Cleanup and Quality Control for Drawings in Civil 3D

This topic is focused on tools to ensure CADD drawings in AutoCAD Civil 3D are clean and usable. This session will comprehensively cover the use of FDOT's QC application for drawing symbology cleanup and QC reporting, but also cover the geometric cleanup tools needed, including the use of the PURGE and MAPCLEAN commands, and other available tools to simplify geometry (such as splines) to more primitive geometry like arcs and polylines.

Learn how to analyze, and clean up data that you receive from various sources: old project files, translated projects, files downloaded or received from external sources, and more. This class will benefit anyone who has inherited a file mess or needs to resurrect old project data utilizing new and/or changed standards.

Prerequisites:

- The most current/latest version of the FDOT Civil 3D State kit should be installed. This will ensure that during the quality check and cleanup process your linetypes, fonts, layers and so forth will translate to the latest FDOT CADD standards.

Drawing Cleanup and Quality Control for Drawings in Civil 3D

Session Objectives:

- **FDOT QC Quick Check Application** – Generates a QC (Quick Check) non-compliance check list for interactive corrections.

 QC Quick Check *Ribbon Tab: FDOT > Quality Control > QC Quic...*

- **FDOT QC Batch** – Batch check DWG files for compliance and generate a report.

 QC Batch *Ribbon Tab: FDOT > Reports > QC Batch*

- **Drawing Clean up (MAPCLEAN)** – Perform cleanup operations on data to improve the accuracy of your DWG file.

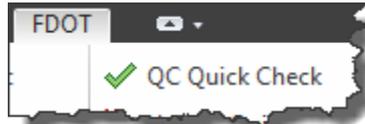
 Drawing Clean Up *Ribbon Tab: FDOT > Quality Control > Drawin...*

- **Misc. Commands:**

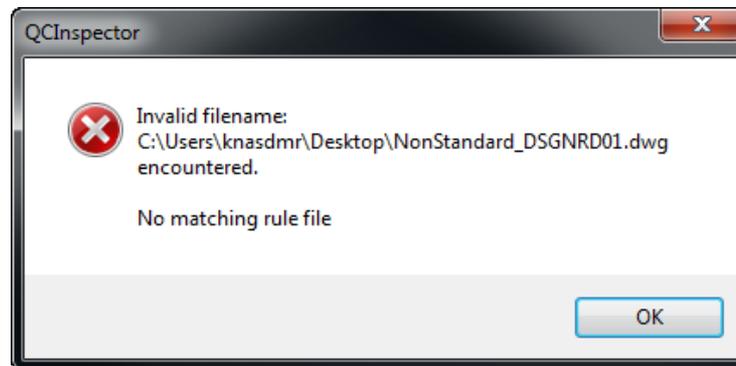
- **Purge** - Remove unused items, such as block definitions, layers, linetypes, text styles, from the drawing file.
- **Audit** - Evaluates the integrity of a drawing and corrects errors.
- **Setbylayer** - Force object properties to Bylayer.

Drawing Cleanup and Quality Control for Drawings in Civil 3D

- **FDOT QC Quick Check Application** – Generates a QC (Quick Check) for non-compliance check list for interactive corrections.



- This tool creates a quick compliance check list of the current drawing against applicable FDOT standard rules and allows the option to fix layer, object properties or create exceptions.
- If a non-standard file name is encountered upon accessing QC Quick Check, the following QCInspector alert will display and the QC process terminated. The file name must be corrected before any QC processes can be run on the file. Files with invalid file names can be included in any QC Report, but will be identified as an Invalid File Name with 0% Compliancy.



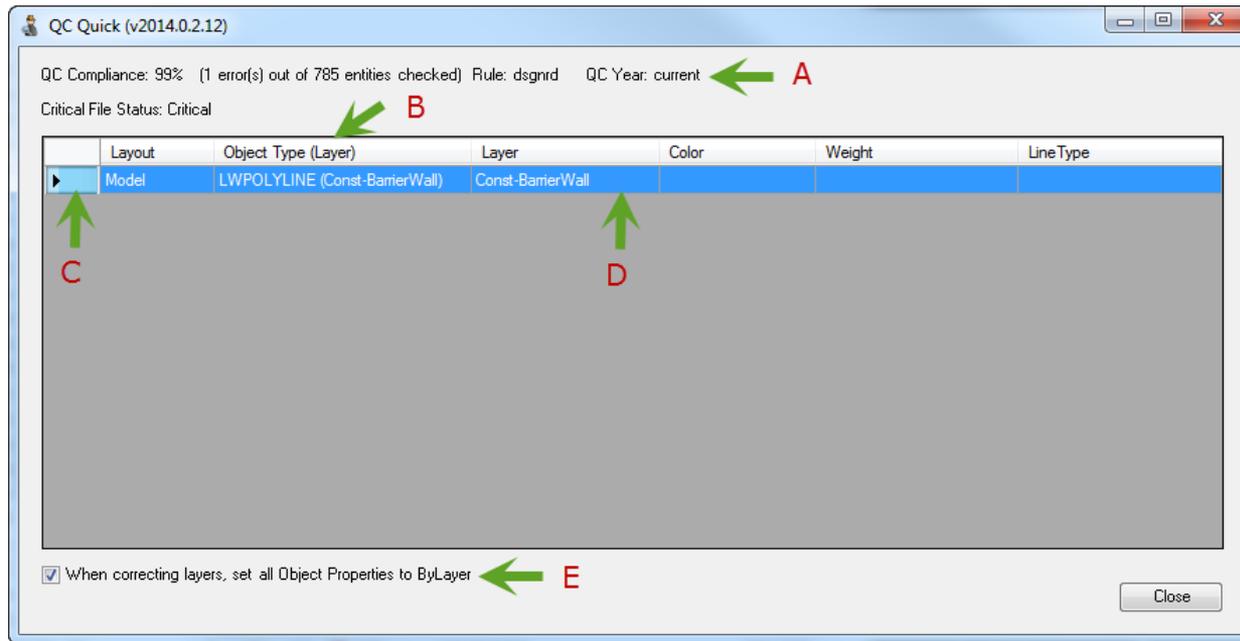
Drawing Cleanup and Quality Control for Drawings in Civil 3D

FDOT QC Quick Check Application

1. Select the **QC Quick Check** icon located on the FDOT tab on the Quality Control panel.
 2. The active design file is analyzed for all invalid layers or property information and an interactive report is created for the user to review and make corrections (**See figure on next page for reference**).
-
- A. **Header:** The QC Compliance Percentage, Errors vs. Total Object Count and Standard Rule used to check objects. The Compliance Percentage and Error Count will update as corrections are made.
 - B. **Title Bar:** Displays the Model, Object Type and Layer, Invalid Layer, and Invalid Object Properties (Color, Weight, Linestyle). The content of the List Box can be sorted (ascending or descending) by clicking any of the column titles. An arrow will display in the title indicating which sort was executed.
 - C. **Selection Column:** Double-clicking any box in the first column of the List Box will zoom the View display window to the specific highlighted error.
 - D. **List Box:** Only invalid/incorrect information will display in the List Box. Single or multiple line items can be selected for correction
 - E. **Default Setting to Auto-set Object Properties:** This 'checkbox' is automatically enabled. All Object Properties (Color, Style & Weight) will be set to "ByLayer" for any Critical or Non-Critical Layer. If toggled off, the Object Properties (Color, Style & Weight) will be set to "ByLayer" for only Critical Layers. The Object Properties for Non-Critical Layers will not be changed.

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FDOT QC Quick Check Application

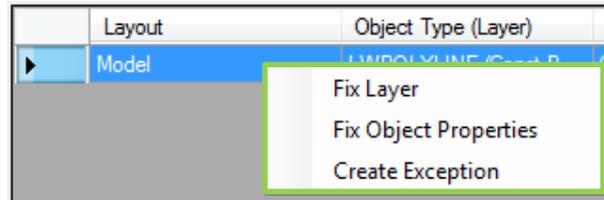


- **There are only two types of errors:** Layer Errors and Object Properties Errors.
- **Layer Error:** If a invalid Layer is found, only the Invalid Layer will display in the Object Type (Layer) List box with no values in the Object Properties List Boxes. Only the 'Fix Layer' or 'Create Exceptions' options can be used for correction on this error type.
- **Object Properties Error:** If a Critical Layer is found with incorrect Object Properties (i.e. Color, Style, or Weight is set to anything other than ByLayer), only the incorrect Object Properties settings will display in the list boxes. Only the 'Fix Object Properties' or 'Create Exceptions' options can be used for correction on this error type.

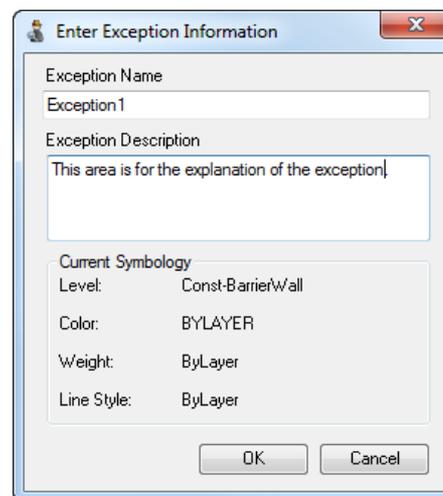
Drawing Cleanup and Quality Control for Drawings in Civil 3D

FDOT QC Quick Check Application

3. Select the items for corrections.
4. After the desired selection is made, right-click on the QC Quick List Box to display the Corrections popup menu.



- The Fix Layer command changes the Layer of the object to the selected valid Layer.
- The Fix Object Properties command will set all invalid Object Properties to "ByLayer". No additional dialog opens.
- The Create Exception command creates new exceptions for the active Standard Rule file.



Drawing Cleanup and Quality Control for Drawings in Civil 3D

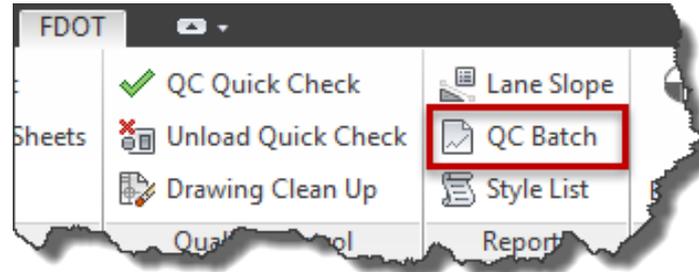
FDOT QC Quick Check Application

5. Click OK to complete the exception or Cancel to exit. Once completed a XXXX_exception.csv file is saved for future use/review by the user. The file is placed in the “eng_data” folder of the active design project file.
6. As each item is corrected (or and exception created), the QC Quick Check removes them automatically from the List Box and updates the header information. The dialog box closes upon completion of all the corrections.

For more detailed information concerning the FDOT QC Quick Check tool, see the help documentation inside the FDOT Civil 3D State kit.

Drawing Cleanup and Quality Control for Drawings in Civil 3D

- **FDOT QC Batch** – Batch check DWG files for compliance and generates a report.



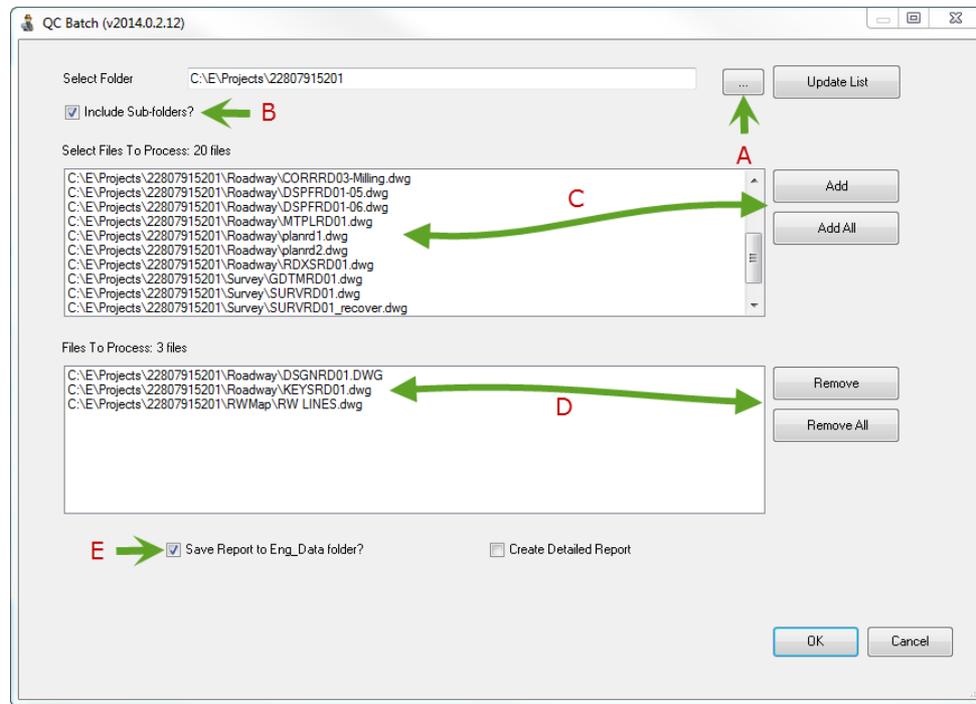
- This tool creates a detailed Quality Control Inspector .HTML report from a selection of files and folders. Listing compliance percentages and individual entity errors that require a resolution. The output file choice is a .TXT or a detailed .HTML report.

Drawing Cleanup and Quality Control for Drawings in Civil 3D FDOT QC Batch

1. Open the **QC Batch** report from the FDOT tab located on the Reports panel (**See figure on next page for reference**).
2. The QC Batch dialog box opens.
 - A. **Select Folder**: Select to browse to the project folder which contains the design files that you want to check.
 - B. **Include Sub-folders?**: Check to include/exclude subfolders in the project directory.
 - C. Select the files that you want to check & select **Add** to process.
 - Select **Add All** to include all files in the Select Files To Process list.
 - D. **Files to Process**: This list will populate with all the files in the selected project.
 - Repeat steps until all desired files are included in the **Files to Process** list box.
 - Undesired files can be removed by using the **Remove** or **Remove All** buttons.
 - E. **Reporting**: By default the file is saved to the “**Eng_Data**” folder. Uncheck to specify a different location. Select **Create Detailed Report** to create a detailed HTML report in the same directory (this is optional).
3. Click **OK** to run report.

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FDOT QC Batch



5. Qc Batch Reports will include the following, if the case applies:

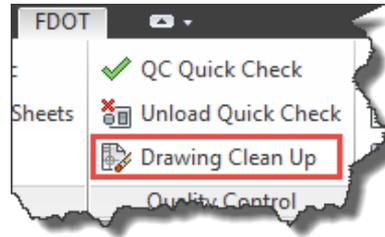
- Any Exceptions created for the Standard Rules.
- If the file has No Graphical Elements Found.
- If there is an invalid Filename.
- If the file cannot be opened, is corrupt or access is denied.

For more detailed information concerning the FDOT QC Batch tool, see the help documentation inside the FDOT Civil 3D State kit.

Drawing Cleanup and Quality Control for Drawings in Civil 3D

Drawing Clean Up (mapclean)

- **Drawing Clean up (MAPCLEAN)** – Perform cleanup operations on data to improve the accuracy of you DWG file.



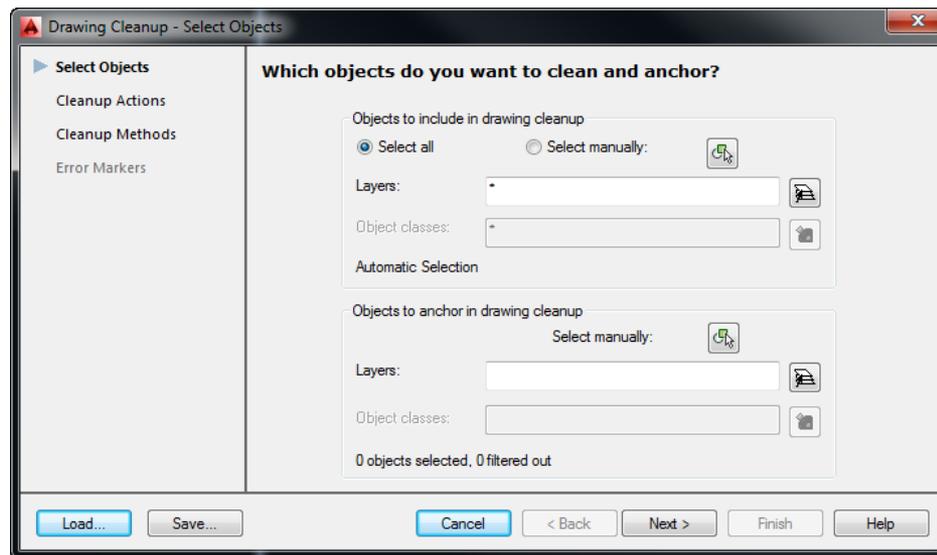
- This tool aids in correcting common geometry errors (resulting from surveying, digitizing, scanning errors, or user input for example) and removes unnecessary detail from complex maps. This is essential when you need accurate and complete drawings.
 - In general, you can only clean up linear objects such as lines, arcs, circles, and polylines.
1. Launch **Drawing Cleanup** from the FDOT Tab located on the Quality Control Panel.
 2. A dialog box launches with a wizard that will guide you through the steps of operation. The steps are listed on the left hand side of the dialog box.
 - **Select Objects** - Select which objects you want to clean and anchor.
 - **Cleanup Actions** - Which cleanup actions do you want to use or perform on the DWG file?
 - **Cleanup Methods** – How do you want to treat the objects that are being cleaned?
 - **Error Markers** – Only available if you choose “Interactive” during drawing clean-up. Specify the marker shape and color for each cleanup action. Specify the marker size, and set options for erasing or maintaining markers before and after cleanup.

Drawing Cleanup and Quality Control for Drawings in Civil 3D

Drawing Clean Up (mapclean)

Select Object:

3. Select the object to included in your drawing cleanup operation. You can select all, manually, or by layer.
 - Anchored objects are used as reference points during cleanup and are not altered or moved; objects being cleaned will be moved towards anchored objects.



4. Click **Next>** to proceed.

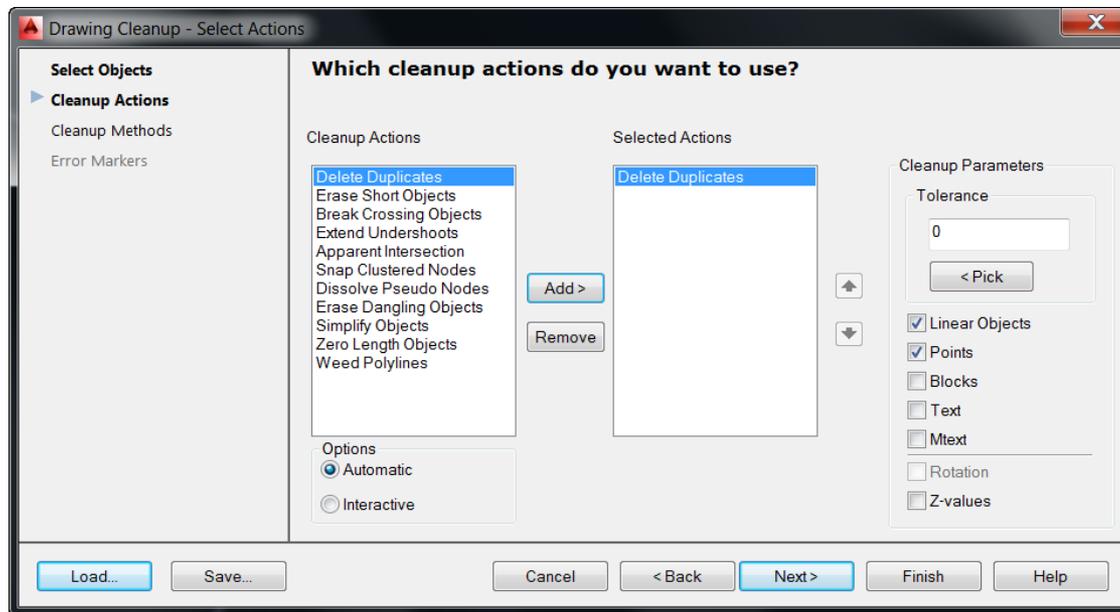
If you have previously saved your drawing cleanup settings in a profile file, select **Load** to reload previous settings.

Drawing Cleanup and Quality Control for Drawings in Civil 3D

Drawing Clean Up (mapclean)

Cleanup Actions:

5. Select one or more Cleanup Actions. After you have your desired action click **ADD>** to add it to the Selected Actions list.
 - Select the action under the Selected Action list to view and change that actions Cleanup Parameters.
 - Under Options Select Automatic to clean the drawing all at once or select Interactive to display Error Markers a and interact with each individual clean up action.



6. Click **Next>** to proceed.

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Drawing Clean Up (mapclean)

Cleanup Actions:

7. **ORDER MATTERS!** Be sure to perform a save-as before running the clean-up tool.

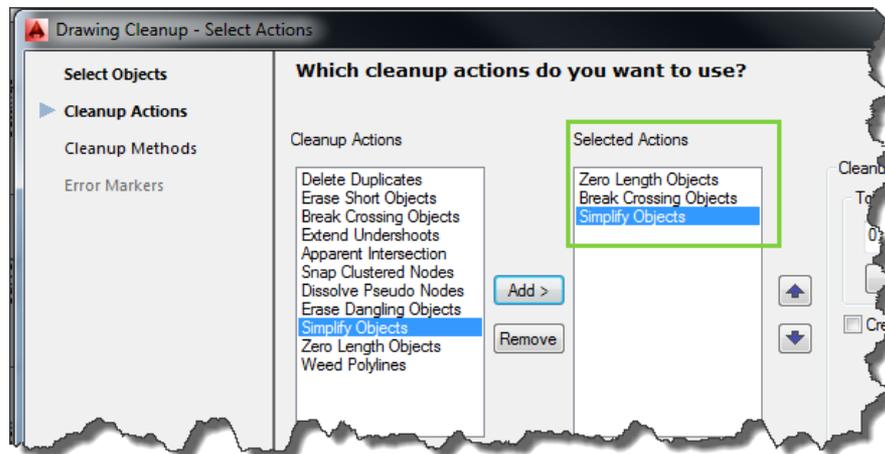
- The tool will run the first action until complete, then run the second action, third, forth... For Example:

1 Zero Length Objects

2 Break Crossing Objects

3 Simplify Objects.

If the Break Crossing objects creates any zero length objects they will not be address because the Zero Length Objects function has already ran. To correct this, run the Map Clean tool again but just run the Zero Length Objects option.



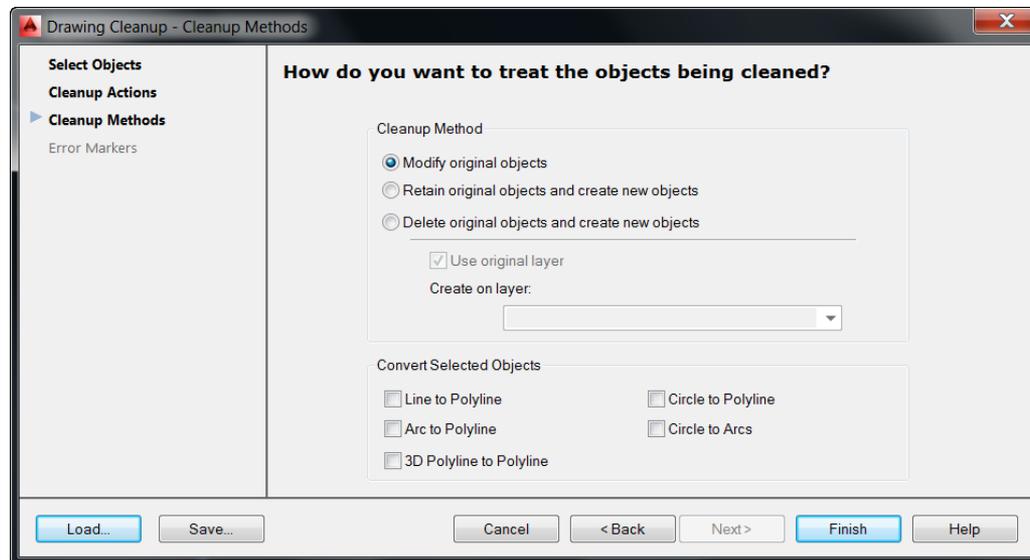
8. Click **Next>** to process to Cleanup Methods.

Drawing Cleanup and Quality Control for Drawings in Civil 3D

Drawing Clean Up (mapclean)

Cleanup Methods:

- Use this dialog box to specify what to do with the original objects after the cleanup process is complete.
 - Under Cleanup Method, choose if you want objects to Modify, Retain original and create new ones or Delete objects and create new ones. If you choose one of the two options to create new objects then you will have the option to place the new objects on a new or existing layer.
 - For Convert Selected Objects, choose how converted objects changes to different entity types.



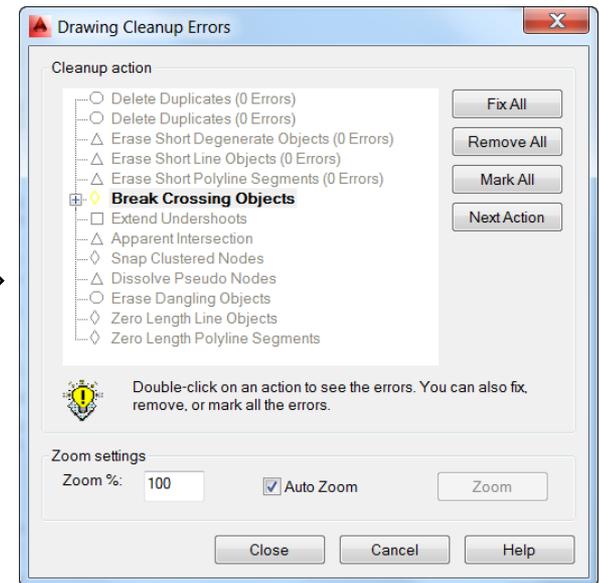
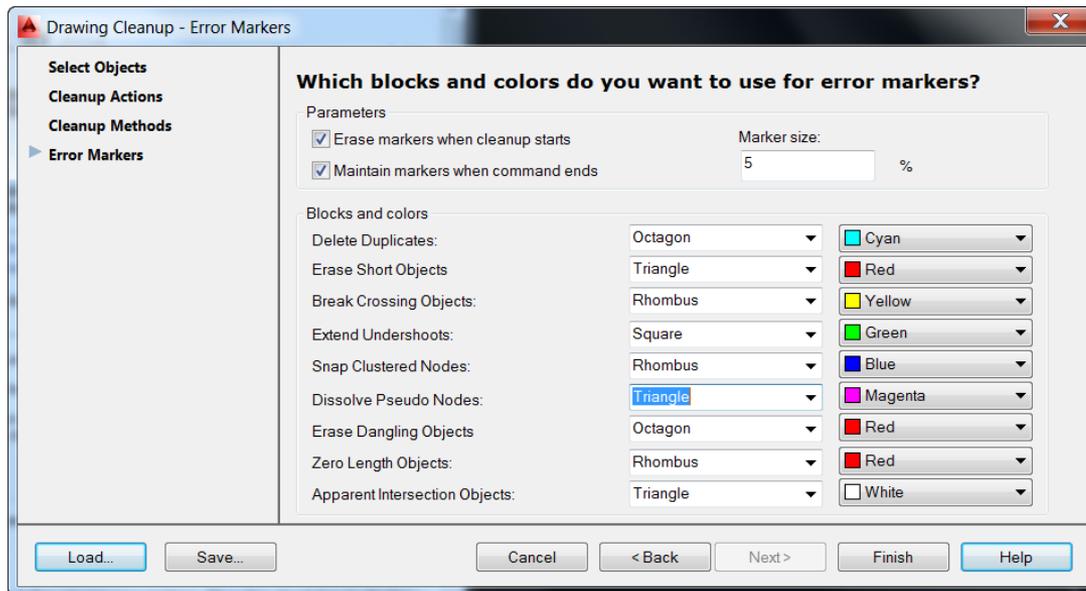
- Click **Next>** to proceed to Error Markers. This option is only available if the “Interaction” option was selected in the “Cleanup Actions” category.

Drawing Cleanup and Quality Control for Drawings in Civil 3D

Drawing Clean Up (mapclean)

Error Markers:

11. Use this dialog box to specify the marker shape and color for each cleanup action. Specify the marker size, and set options for erasing or maintaining markers before and after cleanup.



12. Select **Finish** to complete the Cleanup process. You are then presented with an interactive dialog box that will allow you pick and choose what action to take for each item.

Drawing Cleanup and Quality Control for Drawings in Civil 3D

Purge

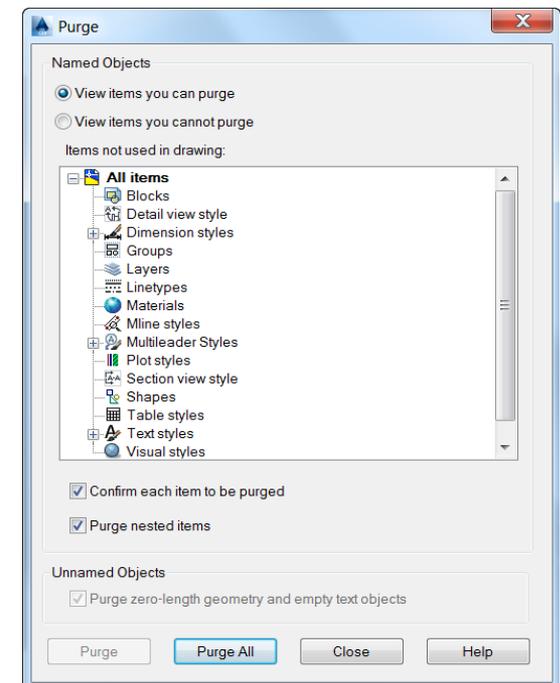
- **Purge** – Removes unused items, such as block definitions and layers, from the drawing.



Application Menu > Drawing Utilities > Purge

- **Named Objects:** Allows you to toggle items you can and cannot purge.
 - Items you can Purge means that they are not being used in the file.
 - Items you can NOT purge mean that they are being used.
- Items with a “+” symbol means that category has items under it that can be deleted from the file.

- **Confirm each item:** Allows you to confirm each item being purged.
- **Purge nested items:** Removes all unused named objects from the drawing even if they are contained within or referenced by other unused named objects.
- **Purge zero-length...:** Deletes geometry of zero length (lines, arcs, polylines and so on) in non-block objects. Also deletes mtext and text that contains only spaces (no text) in non-block objects.
- Select “**Purge**” or **Purge All**” to run the command.



Drawing Cleanup and Quality Control for Drawings in Civil 3D Audit

- **Audit** – Evaluates the integrity of a drawing and corrects some errors.



Application Menu > Drawing Utilities > Audit

- This command checks the file for corruption, and then repairs what it can. It checks the whole file and its XREFs but repairs only the objects in the current space of the current file. Most of the time, corrupted elements reside in model space. AUDIT also diagnoses loaded XREFs and, if errors are found, may report them as fixed. But it cannot write changes back to XREFs, so next time it will report them again. It is wise to repair XREFs first.

1. After starting the Audit command choose Yes to automatically fix the errors found in the drawing. Select No to review at the command line any errors that may have been detected in the drawing file.

```
Command: AUDIT
Fix any errors detected? [Yes/No] <N>: y
Auditing Header
Auditing Tables
Auditing Entities Pass 1
Pass 1 4900 objects audited
Auditing Entities Pass 2
Pass 2 4900 objects audited
Auditing Blocks
1947 Blocks audited
Auditing AcDsRecords
Total errors found 0 fixed 0
Erased 0 objects
Type a command
```

Drawing Cleanup and Quality Control for Drawings in Civil 3D Audit

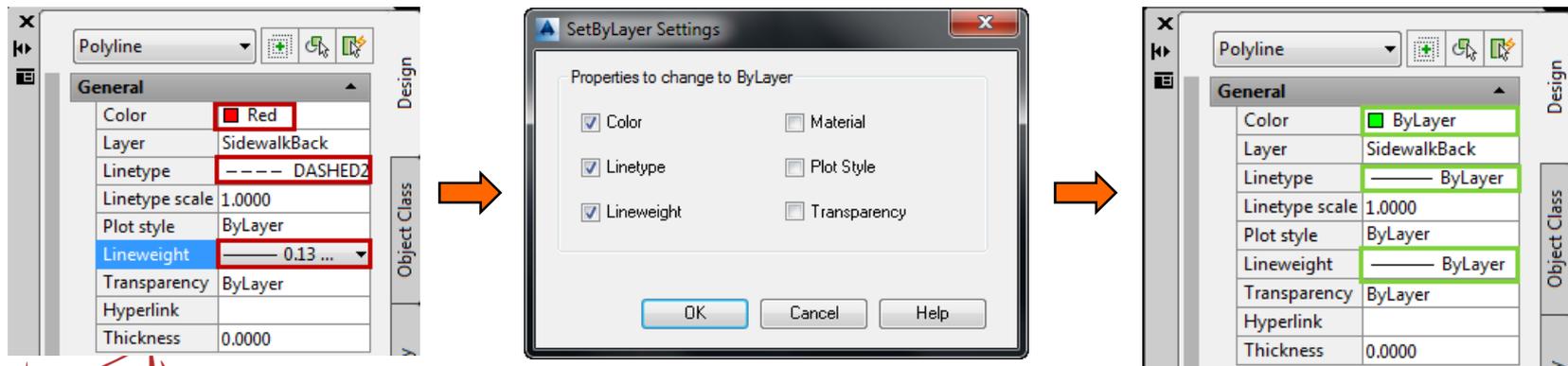
- **SetByLayer** – Force object property to Bylayer

 Set to ByLayer Ribbon Tab: Home > Modify > Set to ByLayer

- This command allows you to specify which properties are changed to Bylayer, including color, linetype, lineweight, and materials.
- 1. After starting the SetByLayer command you can select object's or type S for the settings dialog box.

```
SETBYLAYER Select objects or [Settings]: all
```

- 2. In the SetByLayer setting dialog box, choose which properties, you wish to change to the ByLayer property. Click OK to return to the command bar.
- 3. Next manually select object you wish to change or type all to select the entire drawing.



Notes:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Drawing Cleanup and Quality Control for Drawings in Civil 3D

Thank You!

Are there any questions?

Are there any comments to improve your experience?

Email me:

Mike.Racca@dot.state.fl.us

The Civil 3D FDOT State kit is available for download at:

<http://www.dot.state.fl.us/ecso/downloads/software/FDOT2014CADDSoftware.shtm>

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