

Digital Signature Certification Workflow

This document goes through a workflow of how to create a set of plans that contain an Adobe CDS digital signature using Adobe Acrobat Pro DC. There are several variances on how this can be done. Engineers should use their discretion on how to apply their seal, signature and date to abide by the Engineering Boards Regulations.

A. Definitions:

- a. A **digital signature** is a mathematical scheme for demonstrating the authenticity of a digital message or document. A valid digital signature gives a recipient reason to believe that the message was created by a known sender, and that it was not altered in transit. The Design Division uses the technology from the Entrust Company to authenticate our digital signatures.
- b. An **electronic signature** is any legally recognized electronic means that indicates that a person adopts the contents of an electronic message, such as a scanned representation of an individual's signature imported into a document, or electronic file.

B. Adobe CDS Certificates:

A list of providers for the CDS certificates can be found at the Adobe website at the link listed below. Any of these companies can be used to provide the certificate.

www.adobe.com/security/partners_cds.html

C. Creating the Engineer's Seal from a MicroStation Cell as a File to Use as a Watermark.

- a. Open a blank MicroStation DGN file. Place the seal at a scale of 1.
- b. In MicroStation, go to File>Print
- c. Under **Printer and Paper Size**, change to Bentley Driver and select **TDOTjpeg.plt**
- d. Rotation should be set to **No Rotation** and Print Scale to **0.5**
- e. Go to File>Print and enter a name for the file. This file is your Engineer's Seal for Watermark.

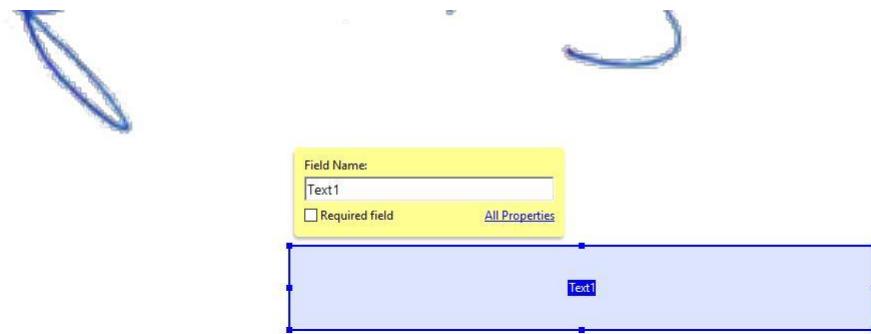
D. Creating the Electronic Generated Signature and Date as a file to Use as a Watermark.

NOTE: This workflow can only be performed by the Registered Professional Engineer that is sealing the plans and cannot be designated to any other person to affix the signature and date.

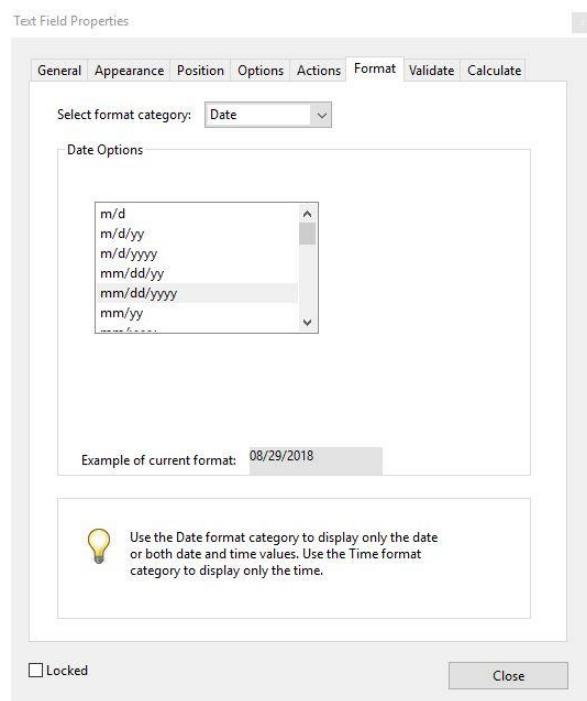
This is only one method for creating your digital signature appearance with an image of your actual signature. Other processes are available, so use what is most familiar to you.

- a. Scan your signature into a file. Cropping may be required and can be done through Adobe Acrobat or other editing software.
- b. The background for the signature needs to be transparent. There are many programs that can be used to do this including Adobe PhotoShop, Illustrator, Streamline and GIMP.
- c. If you did not use Adobe Acrobat to crop the file, the electronic signature file must be made into a pdf. Open Adobe Acrobat and navigate to **File>Create>PDF From File**. Select the file that you just created and then select **Open**.
- d. Add the date field for date to the signature pdf image.
 - i. Navigate to **Tools>Prepare Form**
 - ii. Select a file or scan document, select **Use the current document or browse to a file**, then hit **Start**
 - iii. Navigate to **Add a Text field**

- e. Move the cursor over the document and notice the blue box that is attached to the end. Put this in the general area that you want the date. The date field can be resized by using the mouse and clicking on the blue squares around the field box. Also, the field can be moved by using the mouse and clicking anywhere inside the field box.



- f. Double-click on Text1 or right click in the shaded box and go to Properties. The Text Field Properties box will appear. Select the Format tab at the top. Select the format category as **Date** and format as **mm/dd/yyyy**. Click on the **Format** tab and select **Date** as the Select format category. When finished, select Close. In the **Tasks** window on the right, choose **Close Form Editing**.



- g. Save the file.
- h. Inside the pdf, click in the date field and enter the date. If the date is not entered correctly, a warning message will appear.

08/21/2018

- i. Save the file when you are finished. This file is your Signature and Date for the watermark.

NOTE: When signing a set of plans with a different date, you will need to open this file and modify the date each time and save it. You do not need to create a new file for each date, just overwrite the one that you have.

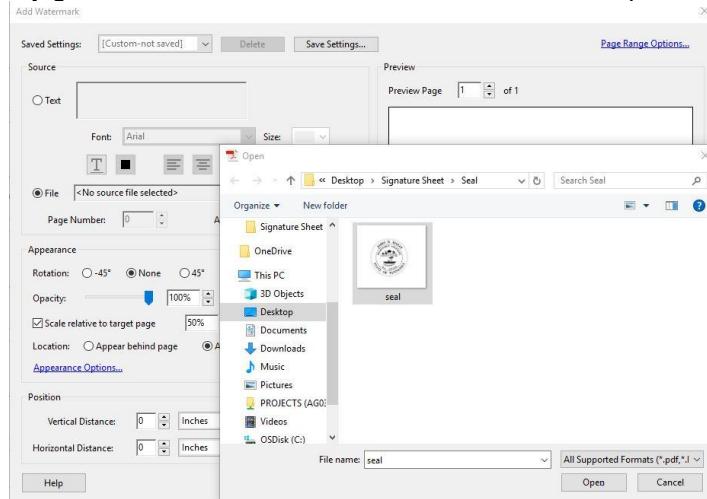
E. Adding the Electronic Generated Seal and Signature as a Watermark

Note: It is not required to add the engineer seal as a watermark. It can be done in each MicroStation .SHT file if preferred.

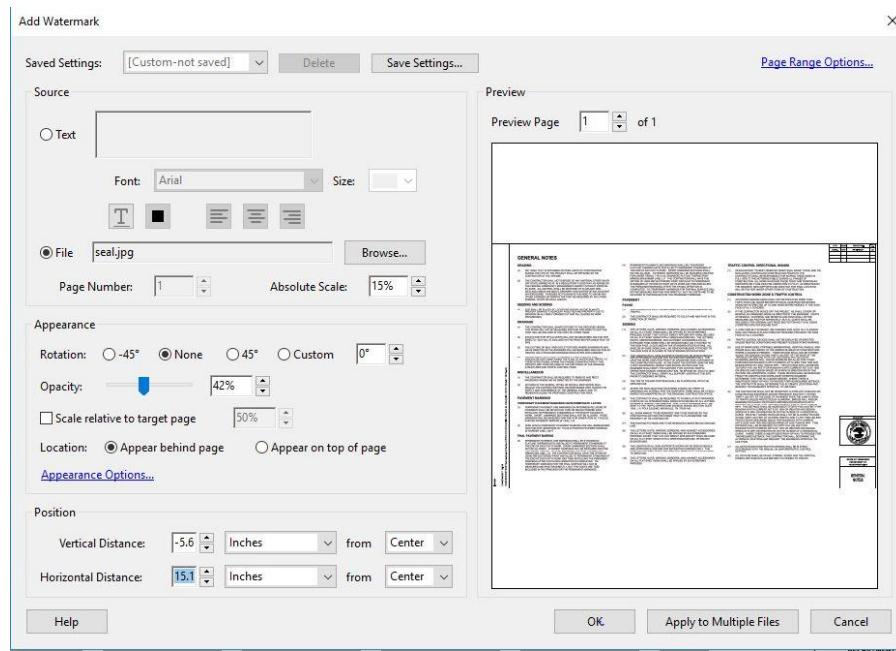
- a. Once the pdf of the plan set is created, open Adobe Acrobat and navigate to **Tools>Edit PDF>Watermark>Add**



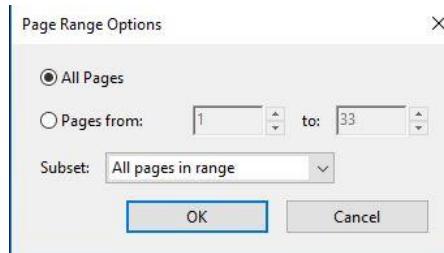
- b. The Add Watermark dialog box will open. In the Source section, click on **File**. This allows you to choose the image for the watermark. Select the **Browse** button and navigate to the file that contains your electronically generated seal. Once the file is selected, click Open.



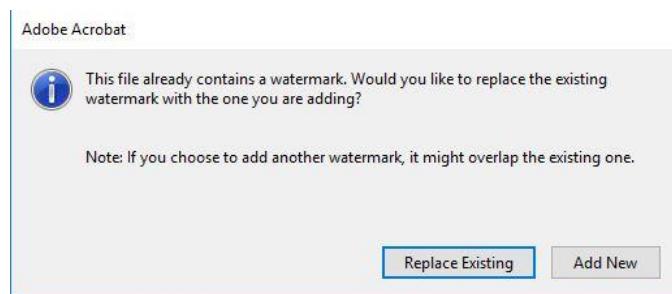
- c. In the Preview window, you may notice that your seal is large. To correct this, set the Absolute Scale to a different scale to size the seal correctly. The scale relative to target page could also be adjusted.
- d. In the Appearance dialog box, select Appear behind page.
- e. In the Position section, change the Vertical and Horizontal Distance to place the seal in the seal box. In the Preview dialog, you can go to a different page to see the location of the seal on the plans.



- f. In the upper right corner, click the **Page Range Options**. Select Pages from and change it to start at page 2. Click **OK**. Starting the watermark at page 2 is so that the signed and dated electronic generated signature watermark will not appear on the Title sheet. This is because the seal box is located at a different location than the rest of the sheets. The title sheet watermark will be added separately.



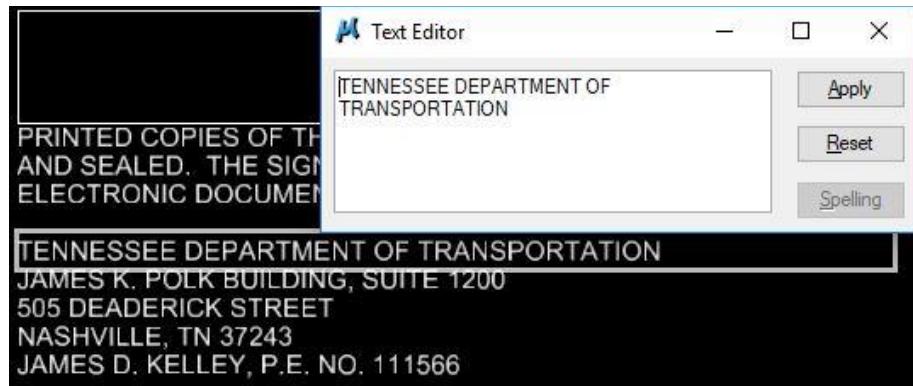
- g. Once the settings are correct, choose Save Settings and give it a name. The settings can then be pulled up each time a watermark needs to be applied on a plan set.
- h. Click **OK** on the Add Watermark dialog. The engineer seal should now appear as a watermark on each sheet.
- i. To add a Signature and Date as Watermark navigate to **Tools>Edit PDF>Watermark>Add** choose Add New on the next dialog window. Follow the procedure as above to watermark Signature and Date.



- j. To add the Watermarks to the title sheet, follow the procedure as above. When you get to the page range options, choose the title page only.

F. Creation of Signature Sheet in MicroStation

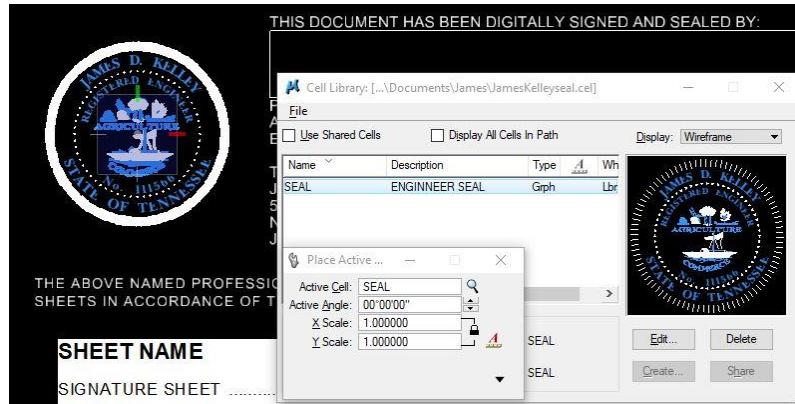
- a. Create a new MicroStation SHT File, seed with Signature Sheet.dgn
- b. Copy all the information from first column to second column. Repeat this step for each PE responsible for plan sheets.
- c. Modify the Signature information for each PE responsible for the plan sheets. This information is the white text above the index. Select **Fill in Single Enter-Data Field**, edit text to your company information. For TDOT employees, this should say Tennessee Department of Transportation and the physical address of your office location.



- d. Modify the linked index. Select and open the linked document, make edits to the index to include the plan set for which the PE is responsible. Save linked document. Repeat the previous step for each responsible PE.

REASONABLE PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE FOLLOWING SHEETS IN ACCORDANCE OF TENV. CODE ANN. §43-5-301.	
SHEET NAME	SHEET NO.
SIGNATURE SHEET	ROADWAY-SITE
TITLE SHEET	1
ROADWAY INDEX AND STANDARD ROADWAY DRAWINGS	1A
STANDARD ROADWAY DRAWINGS	1A1, 1A2
STANDARD TRAFFIC OPERATIONS & STRUCTURE DRAWINGS	1A3
PROJECT COMMITMENTS	1B
ESTIMATED BRIDGE QUANTITIES AND BRIDGE INDEX	2, 2-1, 2-2
ESTIMATED ROADWAY QUANTITIES	2A, 2A1
HYPICAL SECTIONS AND PAVEMENT SCHEDULE	2B, 2B1, 2B2
GENERAL NOTES	2C, 2C1
SPECIAL NOTES	2D, 2D1
TABULATED QUANTITIES	2E, 2E1, 2E2
DETAIL SHEETS	2F, 2F1, 2F2
EIGHT-OF-WAY NOTES, UTILITY NOTES AND UTILITY OWNERS	3
PROPERTY MAP(S) AND EIGHT-OF-WAY ACQUISITION TABLE(S)	3A - 3B
PRESIDENT LAYOUT(S)	4 - 10
EIGHT-OF-WAY DETAILS	4A - 10A
PROPOSED LAYOUT(S)	4B - 10B
PROPOSED PROFILE(S)	4C - 10C
RAMP PROFILE(S)	11 - 12
SIDE ROAD PROFILE(S)	13 - 14
PRIVATE DRIVE, BUSINESS, AND FIELD ENTRANCE PROFILE(S)	15 - 18
DRAINAGE MAP(S)	19 - 20
CULVERT SECTION(S)	21 - 22
EROSION PREVENTION AND SEDIMENT CONTROL PLANS	23, 24, 25 - 27Z
ENVIRONMENTAL MITIGATION PLANS	28, 28A, 28B
BINNING AND PAVEMENT MARKING PLAN(S)	29 - 35
SIGN SCHEDULE SHEET (SL)	36 - 39
MISCELLANEOUS SIGNING DETAILS	40 - 40Z
ROADWAY CROSS SECTIONS	41 - 98
SIDE ROAD CROSS SECTIONS	99 - 108
TRAFFIC CONTROL PLANS	111-150Z
BRIDGE PLANS	151
GEOTECHNICAL PLANS	152
ISIPLANS	153-1
LIGHTING PLANS	154-1
NATURAL STREAM DESIGN PLAN INDEX	155-1
RETAINING WALL DETAILS	156
SIGNAL PLANS	157-1
STORMWATER POLLUTION PREVENTION PLAN (SWPPP) INDEX	158-1
UTILITY INDEX	159-1

- e. Place Engineer Seal in corresponding column for Sheets. Since the seal is only placed on one sheet seal is placed as a cell in this example. Select **Place Active Cell** navigate to location of seal and place at scale of 1. Repeat the previous step for each responsible PE. If preferred seal can be placed as a watermark.

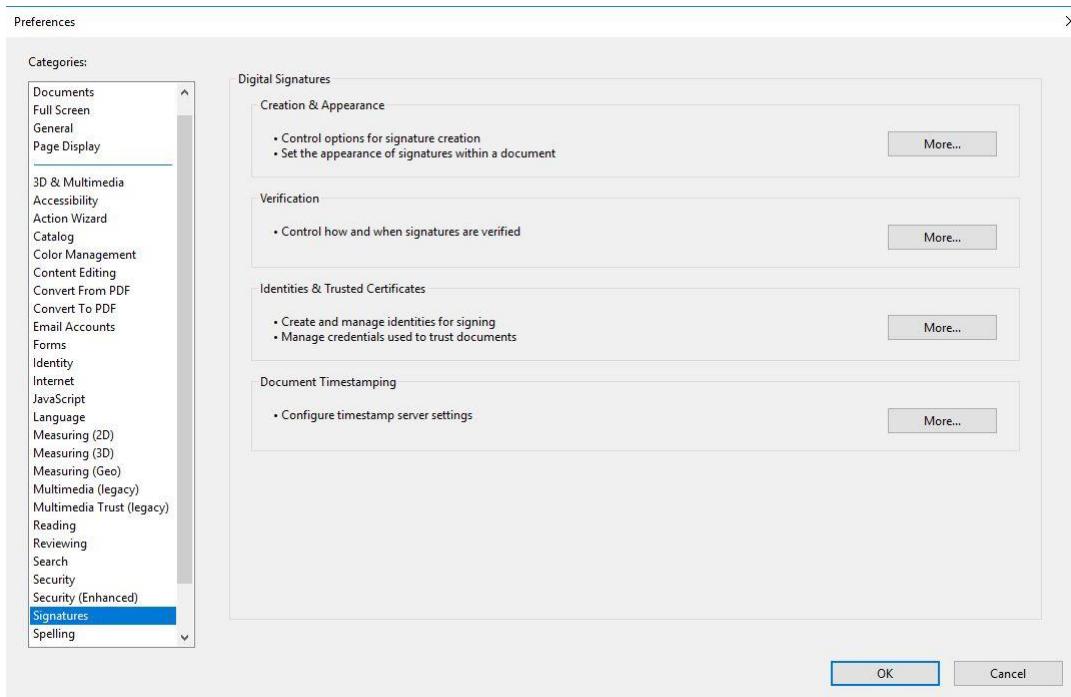


- f. Print sheet as a pdf. Using the Setting File PdfEnglishFul.set.

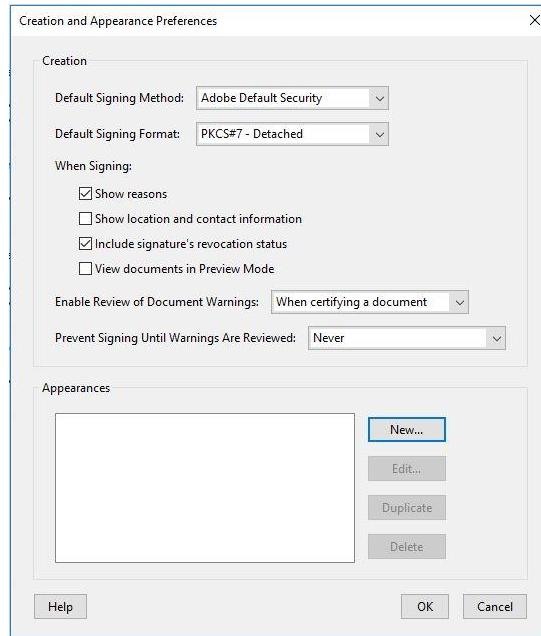
Note: If additional space for PE information is needed, addition Signature Sheets can be created.

G. Creation and Appearance of Digital Signature

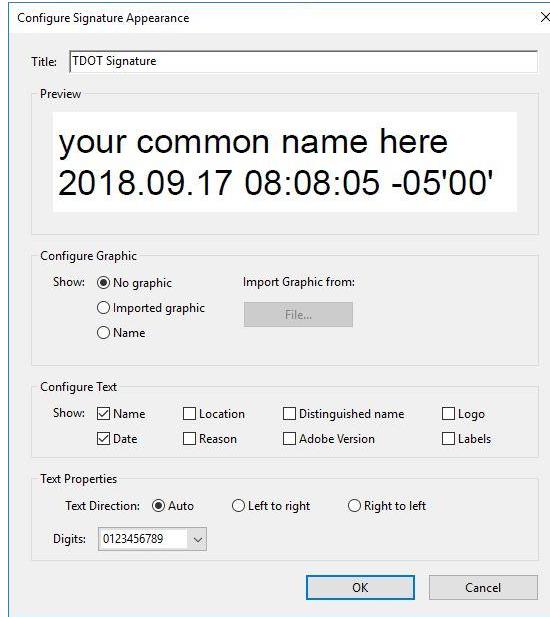
- Create digital signature appearance, open Adobe Acrobat and navigate to **Edit>Preferences**
- From the Preference dialog box, navigate to Signatures.



c. Under Creation & Appearance click the More Button, the following dialog will open.

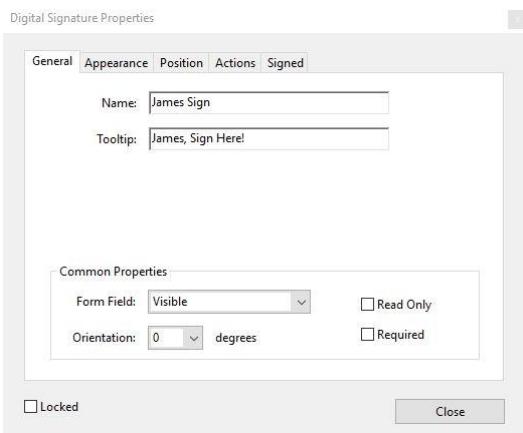


d. Under Appearances click the New, following dialog will open. Create new Signature.

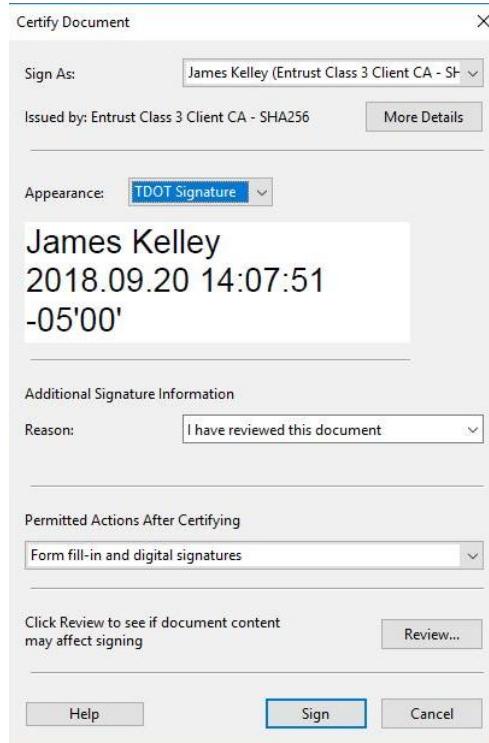


H. Signing and Certifying a Document

- a. Open the completed Signature Sheet from Step F in Adobe Acrobat.
- b. Sign using Signature Blocks, navigate to **Tools>Prepare Form>Add a Digital Signature**. Place signature block in empty box under “THIS DOCUMENT HAS BEEN SIGNED AND SEALED BY:” right click on Signature field and select properties. Change properties to the following:



- c. Repeat the previous step for each responsible PE.
- d. Save document.
- e. The Design Manager or Consultant Engineer responsible for the majority of the sheets will be responsible for certifying the sheets while all other responsible PE's will only have to digitally sign the final document. Navigate to the Signature field, right click, and select Certify with Visible Signature. Modify the dialog box to the following:



- i. In the Reason section, you can leave it blank or choose a reason if needed.
- ii. In the Permitted Actions After Certifying section, select No Changes Allowed. If multiple signatures will be on a sheet, then change this to Form Fill-in and digital signatures.

- f. The electronically generated digitally certified signature now appears on the sheet. The blue ribbon at the top of your document that shows that the file is certified.

Certified by James Kelley <James.D.Kelley@tn.gov>, TDOT, certificate issued by Entrust Class 3 Client CA - SHA256.

Signature Panel		
YEAR	PROJECT NO.	SHEET NO.
2018	ROADWAY&SIGN	
THE DOCUMENT HAS BEEN DIGITALLY SIGNED AND SEALED BY:		
James Kelley 2019.02.07 07:42:05 -06'00'		
PROJECT COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SEPARATE ELECTRONIC DOCUMENTS. THEY MUST BE VIEWED ON THE ELECTRONIC DOCUMENTS.		
TENNESSEE DEPARTMENT OF TRANSPORTATION JAMES K. POLK BUILDING, SUITE 1000 NASHVILLE, TN 37243 NASHVILLE, TN 37243 P.O. NO. 11998		
THE ABOVE NAMED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE FOLLOWING SHEETS IN ACCORDANCE OF TENN. CODE ANN. § 60A-1.		
SHEET NAME SHEET NO.		
SIGNATURE SHEET ROADWAY SIGN		
TITLE SHEET 1		
ROADWAY INDEX AND STANDARD ROADWAY DRAWINGS 1A		
STANDARD ROADWAY DRAWINGS 1A1, 1A2		
STANDARD TRAFFIC OPERATIONS & STRUCTURE DRAWINGS 1B		
PROJECT COMMITMENTS 1B		
ESTIMATED ROADWAY QUANTITIES 2		
TYPICAL SECTIONS AND PAVEMENT SCHEDULE 2B, 2B1, 2B2		
GRAPHIC NOTES 2C		
SPECIAL NOTES 2D		
TABULATED QUANTITIES 2E		
DETAIL SHEET 2F		
RIGHT-OF-WAY NOTES, UTILITY NOTES AND UTILITY OWNERS 3		
PROPERTY MAP(S) AND RIGHT-OF-WAY ACQUISITION TABLE(S) 3A-3B		
PRESENT LAYOUT(S) 4-10		
RIGHT-OF-WAY LAYOUT(S) 4A-10A		
PROPOSED LAYOUT(S) 4B-10B		
PROPOSED PROFILE(S) 4C-10C		
RAILING PROFILE(S) 11-12		
SIDE ROAD PROFILE(S) 13-14		
TRAFFIC CONTROL PLANS T-1602		

STATE OF TENNESSEE
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SIGNATURE SHEET

- g. Save the pdf and send to any remaining PE's for Signature.
 h. Keep a separate copy of the Certified Signature Sheet. Below is an example of a project with multiple signatures, TDOT developed projects will generally only contain one signature.

Certified by James Kelley <James.D.Kelley@tn.gov>, TDOT, certificate issued by Entrust Class 3 Client CA - SHA256. Signed and all signatures are valid.

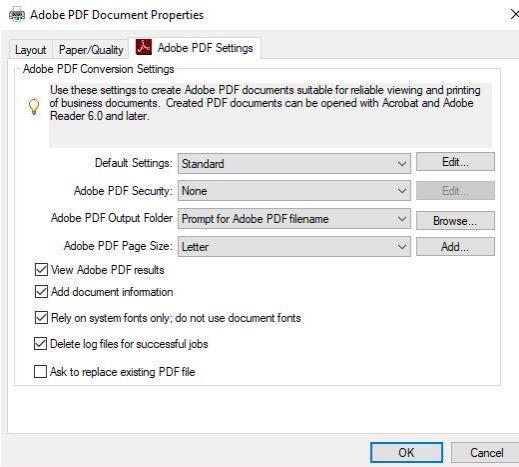
Signature Panel		
YEAR	PROJECT NO.	SHEET NO.
2018	ROADWAY&SIGN	
THE DOCUMENT HAS BEEN DIGITALLY SIGNED AND SEALED BY:		
James Kelley 2019.02.11 07:55:56 -06'00'		
PROJECT COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SEPARATE ELECTRONIC DOCUMENTS. THEY MUST BE VIEWED ON THE ELECTRONIC DOCUMENTS.		
TENNESSEE DEPARTMENT OF TRANSPORTATION JAMES K. POLK BUILDING, SUITE 1000 NASHVILLE, TN 37243 NASHVILLE, TN 37243 P.O. NO. 11998		
THE ABOVE NAMED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE FOLLOWING SHEETS IN ACCORDANCE OF TENN. CODE ANN. § 60A-1.		
SHEET NAME SHEET NO.		
SIGNATURE SHEET ROADWAY SIGN		
TITLE SHEET 1		
ROADWAY INDEX AND STANDARD ROADWAY DRAWINGS 1A		
STANDARD ROADWAY DRAWINGS 1A1, 1A2		
STANDARD TRAFFIC OPERATIONS & STRUCTURE DRAWINGS 1B		
PROJECT COMMITMENTS 1B		
ESTIMATED ROADWAY QUANTITIES 2		
TYPICAL SECTIONS AND PAVEMENT SCHEDULE 2B, 2B1, 2B2		
GRAPHIC NOTES 2C		
SPECIAL NOTES 2D		
TABULATED QUANTITIES 2E		
DETAIL SHEET 2F		
RIGHT-OF-WAY NOTES, UTILITY NOTES AND UTILITY OWNERS 3		
PROPERTY MAP(S) AND RIGHT-OF-WAY ACQUISITION TABLE(S) 3A-3B		
PRESENT LAYOUT(S) 4-10		
RIGHT-OF-WAY LAYOUT(S) 4A-10A		
PROPOSED LAYOUT(S) 4B-10B		
PROPOSED PROFILE(S) 4C-10C		
RAILING PROFILE(S) 11-12		
SIDE ROAD PROFILE(S) 13-14		
PRIVATE DRIVE, BUSINESS, AND FIELD ENTRANCE PROFILE(S) 15-18		
DIVERTMENT PROFILE(S) 19-22		
CULVERT SECTION(S) 23-22		
EROSION PREVENTION AND SEDIMENT CONTROL PLANS 2B, 2B1, 2B2		
ROADWAY CROSS SECTIONS 4-9B		
SIDE ROAD CROSS SECTIONS 4B-9B		
TRAFFIC CONTROL PLANS T-1602		

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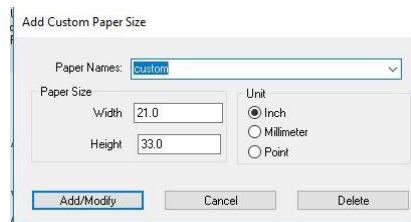
SIGNATURE SHEET

I. Revisions to Plan Set

- a. In order to complete a revision on a previous sealed sheet you must first remove the certification.
- b. Open Certified Signature Sheet, navigate to **File > Print**. Under Printer select Adobe PDF, select the properties button. The following dialog box will open.



- c. Scroll down to the Adobe PDF Page Size and Select Add. The following dialog box will open. Add a custom paper size of 33 X 21 to match TDOT sheet size.



- d. Navigate to Layout and change Orientation from Portrait to Landscape. Print the signature sheet.
- e. Create Signature Sheet Sign2 following same process listed in Step F (Creation of Signature Sheet in MicroStation).
- f. Add a revision note in the upper right corner of the Signature Sheet - **Revision Date: Added Sheet**.

- f. For revisions all signature sheets will be included in the final pdf document.

J. Sheet Number Naming Convention

- a. This workflow follows the normal Digital Signature Certification process for the Design Division, for other divisions follow the Standard Signature Sheet naming below:

DIVISION/SECTION	SHEET NAME
Roadway Design	ROADWAY-SIGN1
Structures -Bridge	BRIDGE-SIGN1
Geotechnical	GEOTECH-SIGN1
Signal Design	SIGNAL-SIGN1
Lighting Design	LIGHTING-SIGN1
ITS	ITS-SIGN1
Natural Stream Design	NS-SIGN1
Structures – Retaining Wall	R-SIGN1

- b. If multiple Signature Sheets are needed, naming convention will follow the format above and be listed in the Index as Division/Section-SIGN1-X, where X represents last sheet number used.

CONSTRUCTION INDEX OF SHEETS

SIGNATURE SHEETS	ROADWAY-SIGN1-3
TITLE SHEET.....	1
ROADWAY INDEX AND STANDARD ROADWAY DRAWINGS	1A
STANDARD ROADWAY DRAWINGS	1A1, 1A2