



Electronic Plan Submittal for E-Construction

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E-Plans – What it means and how do we get there?



Electronic Plan Creation Process

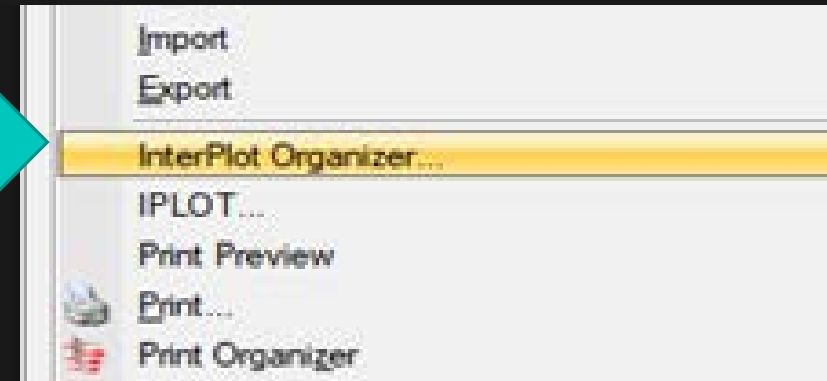
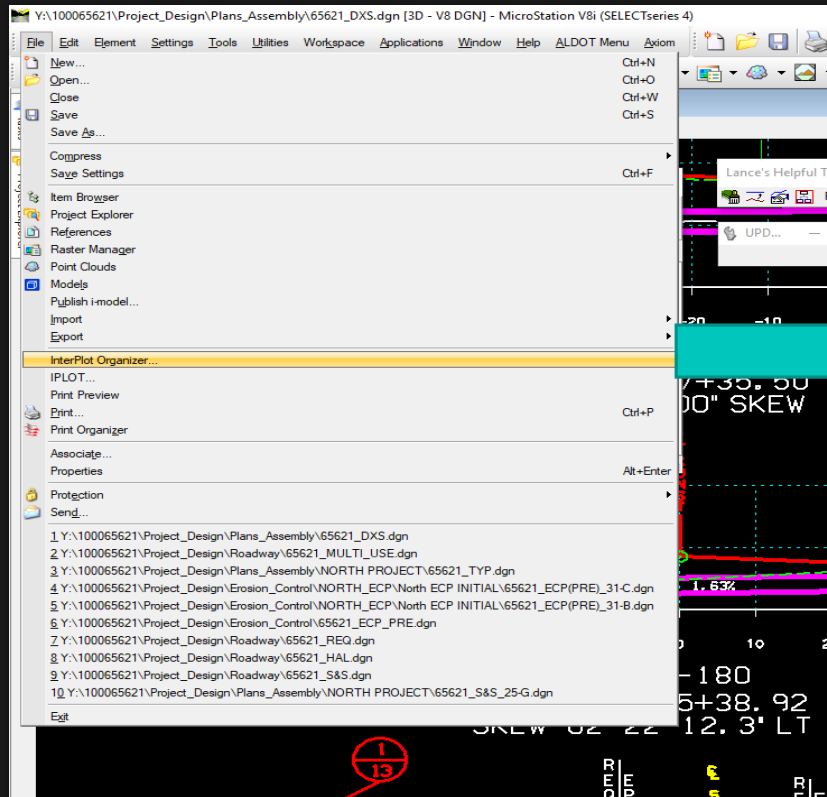
- 
- Plan sheets are created using CADD software (Microstation, InRoads, GIS, etc.)
 - Plan sheets are then imported into InterPlot Organizer
 - InterPlot Organizer then creates a PDF of the plan set

InterPlot Organizer

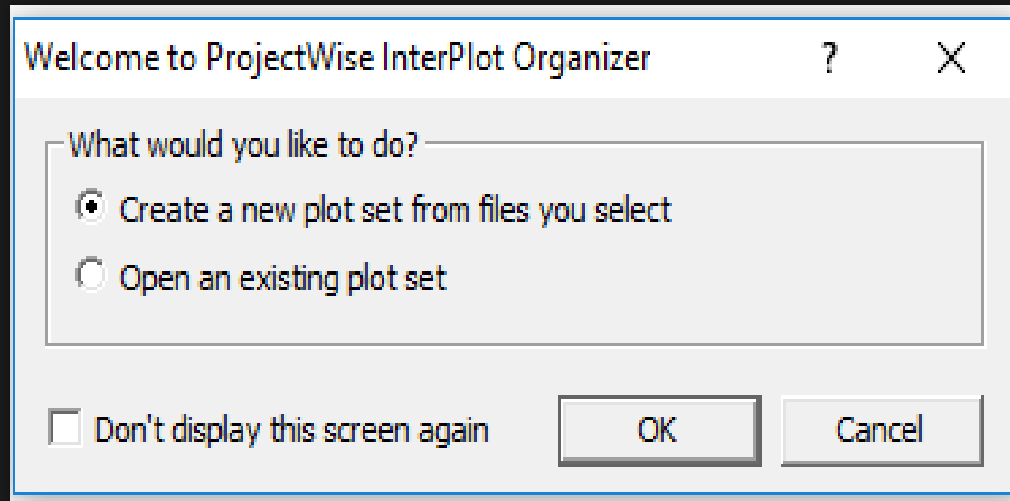


- Separate product from Microstation and InRoads but can be used with it
- All DOT personnel should have access to the program

InterPlot Organizer



InterPlot Organizer



- Opens from either Microstation or by double clicking a previously made InterPlot set (.ips file)

InterPlot Organizer

Input Files

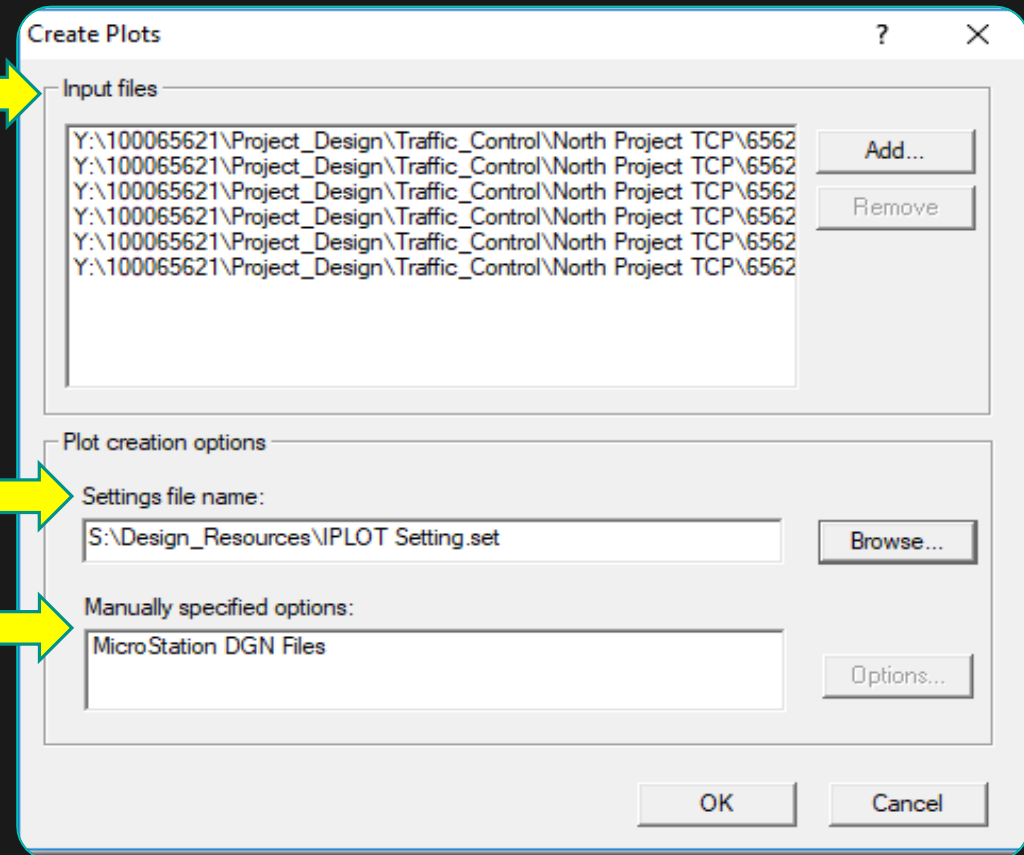
- All sheet files should be added here

Settings File Name

- Used to recognize sheet border and scale to fit 11" x 17"

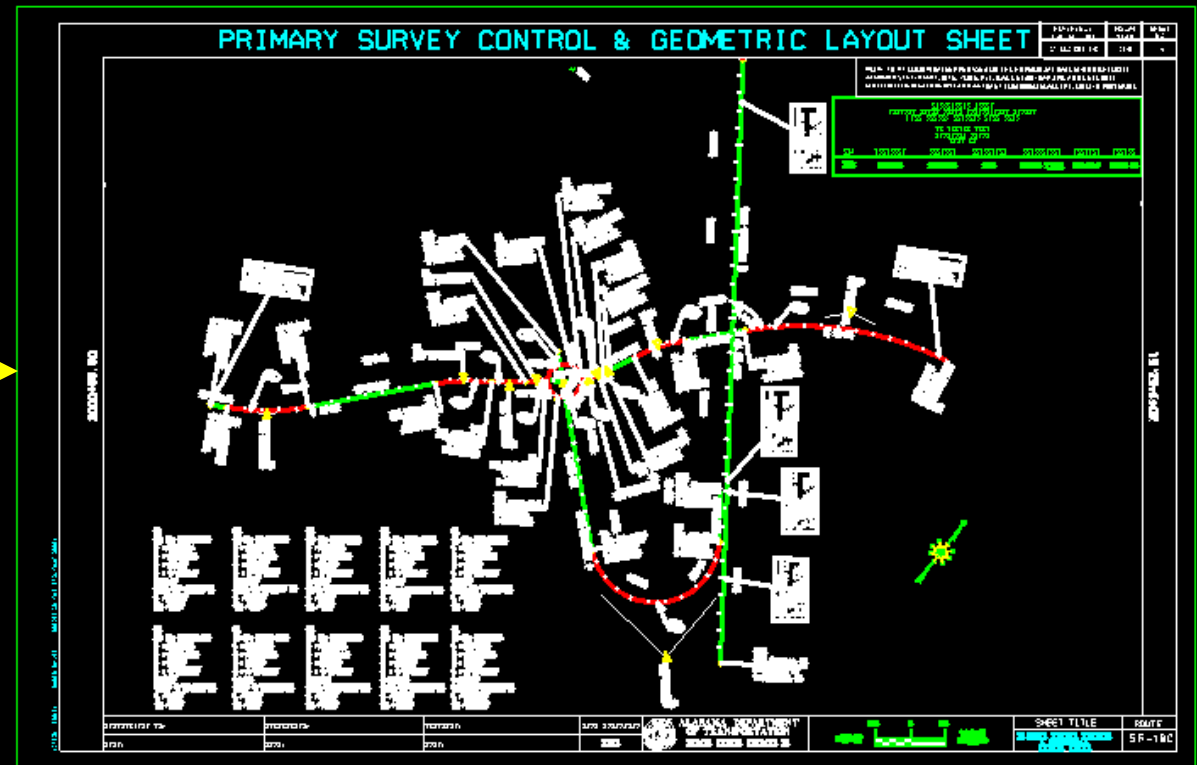
Manually Specified Options

- Only used if a settings file is not designated



InterPlot Settings File Name

- Settings file searches for outside sheet border
- Border must be on color number 114 for settings file to work
- A copy of the settings file can be found on the CADD Resources web page and also at the following link:
\\dsnts020\CAD_Resources\Plotting\IPlot\IplotSettings\Iplot_Organizer_Sheets.set



InterPlot Organizer

North Project.ips - ProjectWise InterPlot Organizer CONNECT Edition

File Edit View Tools Help

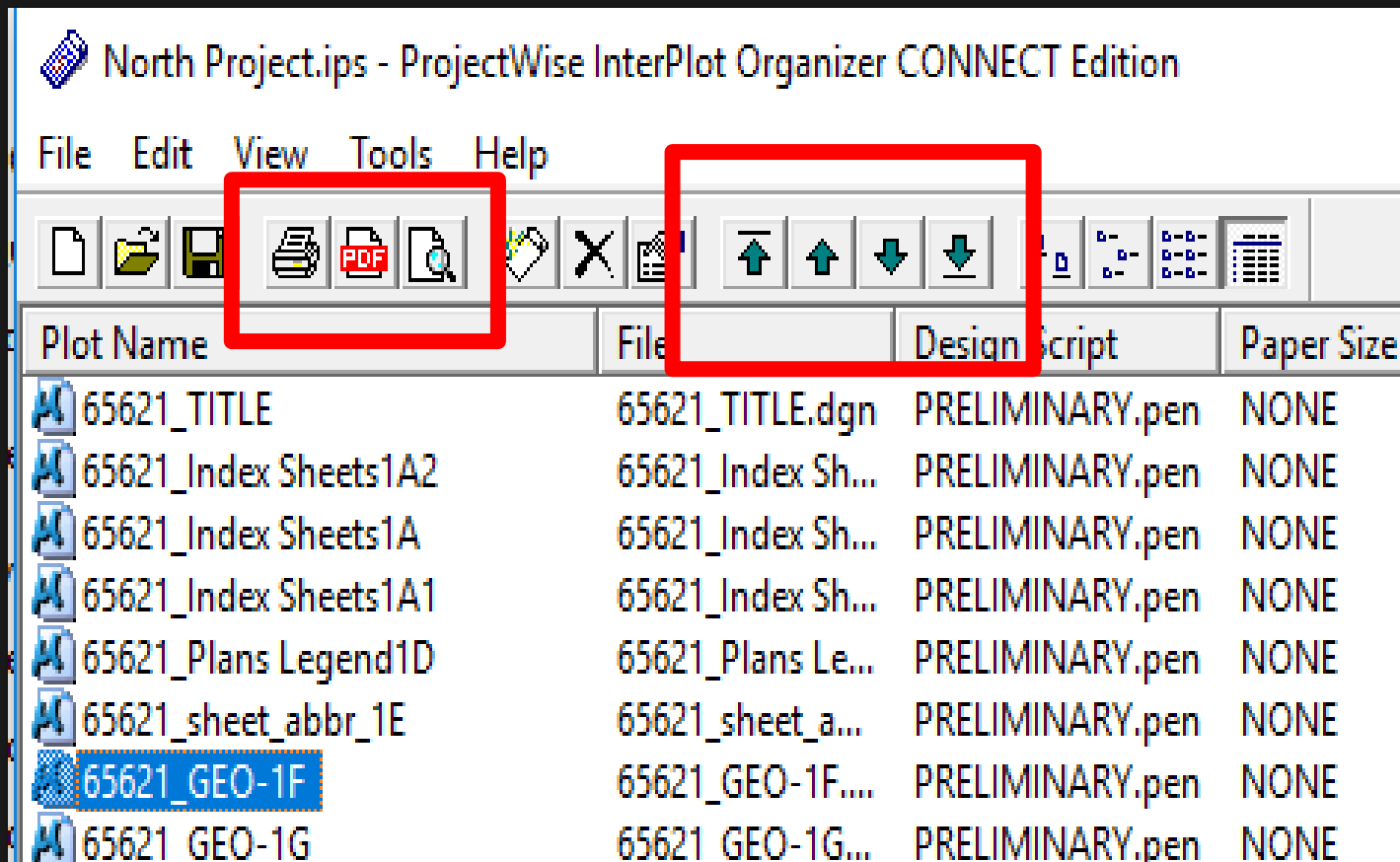
Plot Name	File	Design Script	Paper Size	Scale	Size	Orig
65621_TITLE	65621_TITLE.dgn	PRELIMINARY.pen	NONE	10560:1	17, 11	0,
65621_Index Sheets1A2	65621_Index Sh...	PRELIMINARY.pen	NONE	2:1	17, 11	0,
65621_Index Sheets1A	65621_Index Sh...	PRELIMINARY.pen	NONE	2:1	17, 11	0,
65621_Index Sheets1A1	65621_Index Sh...	PRELIMINARY.pen	NONE	2:1	17, 11	0,
65621_Plans Legend1D	65621_Plans Le...	PRELIMINARY.pen	NONE	100:1	17, 11	0,
65621_sheet_abbr_1E	65621_sheet_a...	PRELIMINARY.pen	NONE	100:1	17, 11	0,
65621_GEO-1F	65621_GEO-1F....	PRELIMINARY.pen	NONE	400:1	17, 11	0,
65621_GEO-1G	65621_GEO-1G...	PRELIMINARY.pen	NONE	400:1	17, 11	0,
65621_GEO-1H	65621_GEO-1H...	PRELIMINARY.pen	NONE	400:1	17, 11	0,
65621_GEO DATA	65621_GEO DA...	PRELIMINARY.pen	NONE	200:1	17, 11	0,
65621_GEO DATA1	65621_GEO DA...	PRELIMINARY.pen	NONE	200:1	17, 11	0,
65621_GEO DATA2	65621_GEO DA...	PRELIMINARY.pen	NONE	200:1	17, 11	0,
65621_GEO DATA3	65621_GEO DA...	PRELIMINARY.pen	NONE	200:1	17, 11	0,
65621_TYP7	65621_TYP.dgn	PRELIMINARY.pen	NONE	20:1	17, 11	0,

Scale and Size

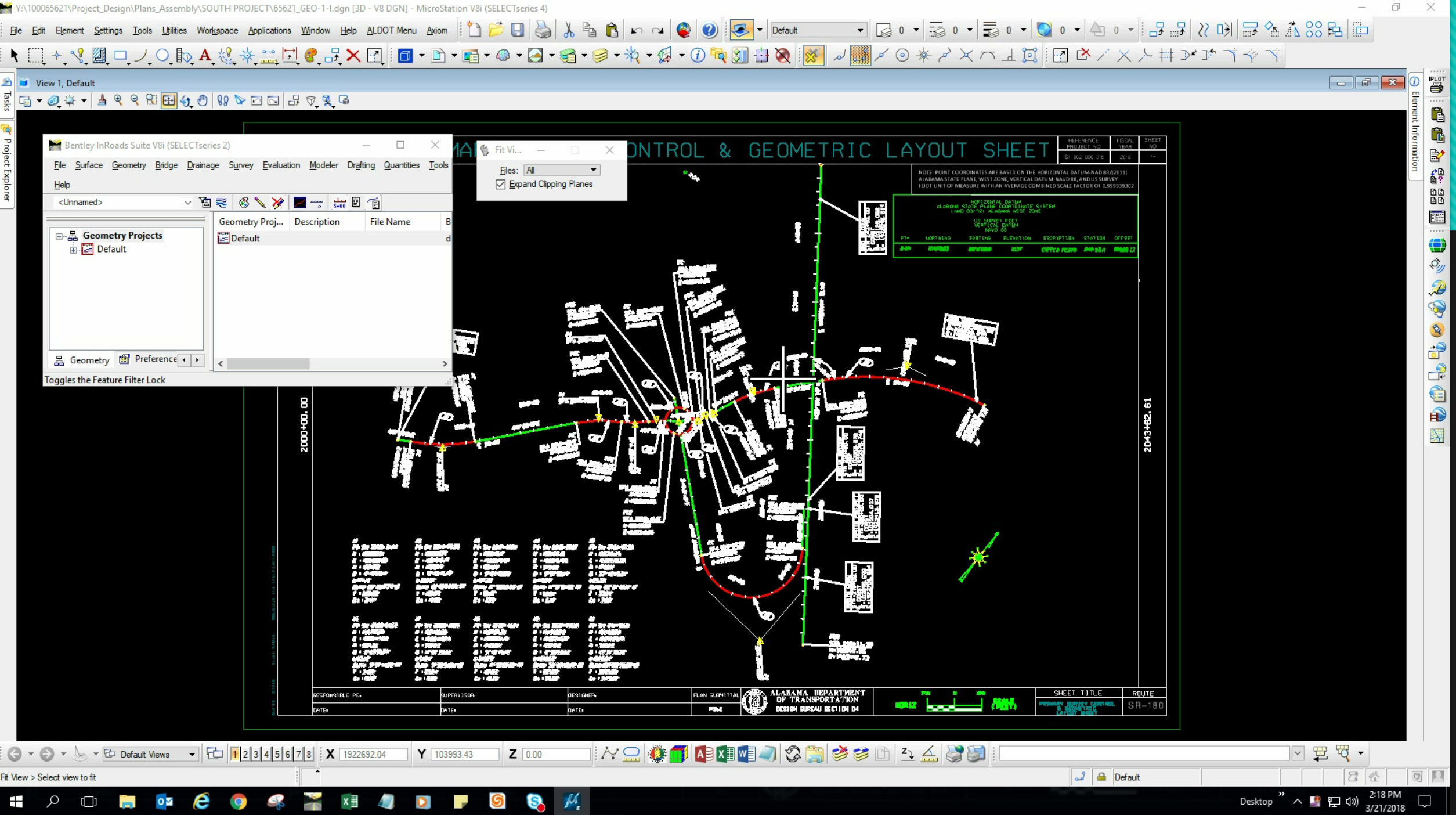
Paper Size	Scale	Size	Orig
NONE	10560:1	17, 11	0,
NONE	2:1	17, 11	0,
NONE	2:1	17, 11	0,
NONE	2:1	17, 11	0,
NONE	100:1	17, 11	0,
NONE	100:1	17, 11	0,
NONE	400:1	17, 11	0,
NONE	400:1	17, 11	0,
NONE	400:1	17, 11	0,
NONE	200:1	17, 11	0,
NONE	200:1	17, 11	0,
NONE	200:1	17, 11	0,
NONE	200:1	17, 11	0,

- Half size plan sets are 11" x 17"
- Full size plan sets are 22" x 34"
- When going from CN submittal to OE submittal, simply change the sheet size to be 22" x 34" and sheet will scale proportionately.

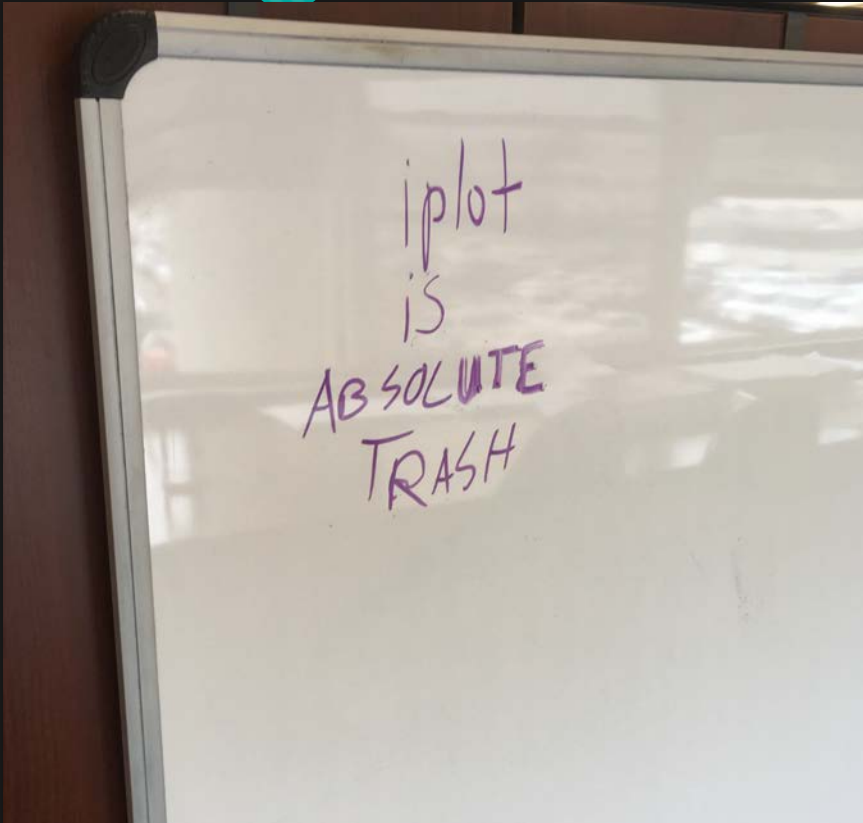
Order and Export to PDF



- Use arrows to move sheet files up or down to designated order that matches index
- Once all sheets are in the correct order, save the InterPlot file and this can be opened and modified at a later date
- Export to PDF creates PDF of all sheets or selected sheets
- PDF is already OCR (optical character recognition) compatible



Common Problems with InterPlot Organizer



Plan sheets will not size to 11" x 17"

- Possible solution – change the default printer
- Possible solution – verify sheet border is scaled correctly

Cross section sheets are brought in out of order

- Possible solution – Verify each sheet number and reorder accordingly

Blank sheets are created in the plan assembly

- Possible solution – Delete an blank or duplicate sheets that are not needed in plan set

Benefits to using PDFs



Benefits to using PDFs

Only takes up digital storage space, not physical space

Universal (no formatting issues)

Small file size

Can combine sheets from multiple bureaus with relative ease



Image: Mimooh/ Wikipedia

What is the next step? GFO 3-77

STATE OF ALABAMA
DEPARTMENT OF TRANSPORTATION
GUIDELINES FOR OPERATION

SUBJECT: AS-LET PLANS FOR E-CONSTRUCTION

As soon as possible after a project is let to contract, the As-Let Plans, which include any revisions outlined in GFO 3-5, shall be saved by the lead designer in a PDF format. This shall be done by "printing to PDF" from the source file in Microstation and submitting to the Bureau of Office Engineer, Records Management Section, for inclusion in the Hummingbird (eDocs) system for records retention and the system.

Once the file has been saved into Hummingbird (eDocs), the e-Construction Section of the Construction Bureau will copy the file into CAMMS in the Plans Tab of Construction>Contract>Documents. With the Department's implementation of e-Construction and tablet usage by project personnel, this will allow Project Managers and Inspectors electronic access to the plans and will minimize the need for paper plans for most of the project staff. Other benefits of providing As-Let Plans in this PDF format include:

- **Smaller File Size** – A scanned PDF is 3.5 times larger than a PDF created directly from the source file. This is critical when looking at tablets and other mobile devices that have less storage capacity than a standard computer. For example, the CHD Phase 2 plans are 1.3 GB for the PDF created directly from the source. The scanned version is 4.6 GB. This also provides a much quicker download.
- **Searchability** – Original PDFs are not searchable for text. Scanned PDFs are not. This function is used almost daily by every inspector.
- **Markups** – When highlighting or underlining text in an original, it matches it to the text.
- **Quality of Image** – Scanned documents can have shading and rotation issues from the scanning process. Originals do not have that issue.
- **Resolution** – When zooming in the original, it has much clearer lines and easier to read. The scanned document has a limitation of 300% zoom before noticing image quality loss. The original can zoom infinitely without loss.
- **Reduced Cost** – Each paper copy, whether full or half-size, has a cost for the Department to produce. By making the plans available as a PDF to an inspector with a tablet, it reduces the need for a half size copy and saves the Department money. With the number of projects the Department has annually, this should provide a substantial cost savings not to mention environmental impact.
- **Availability** – If a project gets four sets of plans and has 6 inspectors, someone is going to not have them. It is common for inspectors to not have a set or to only have a partial set. Digital versions can be easily distributed infinite times at no cost.
- **As-Built-Plans** – Markups provided by staff during the life of the project will then become a viable set of As-Built-Plans as required by the Construction Manual but in a shareable

3-77 09-17

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NOT APPROVED

Current Process of Plans Submittals

Lead designer submits full size PAPER plan sets to Office Engineer

Office Engineer scans the original plan set

The digital plan set is uploaded into Hummingbird and copies are ran off of scanned plan set

E-Construction brings the file from Hummingbird

GFO 3-77 Process

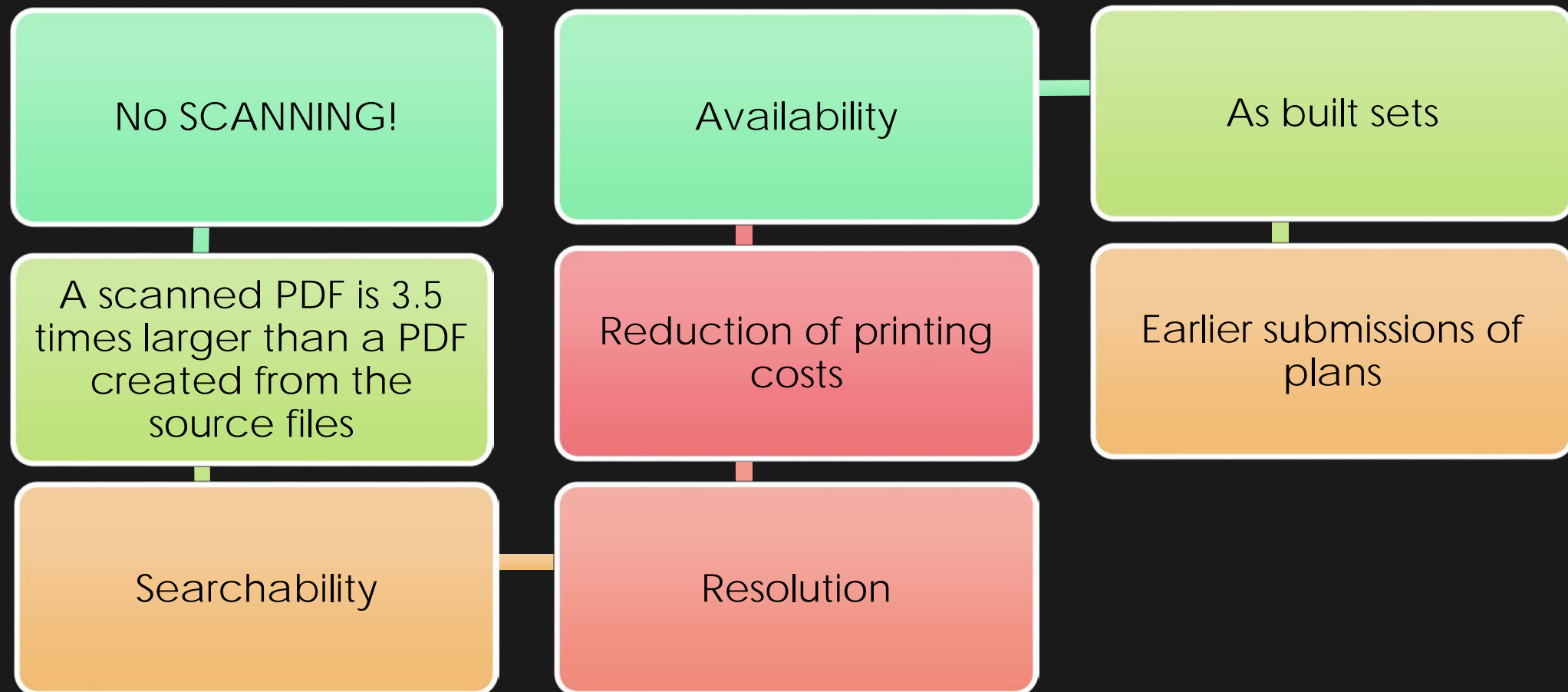


Lead designer
creates PDF instead
of Office Engineer
scanned the plan set

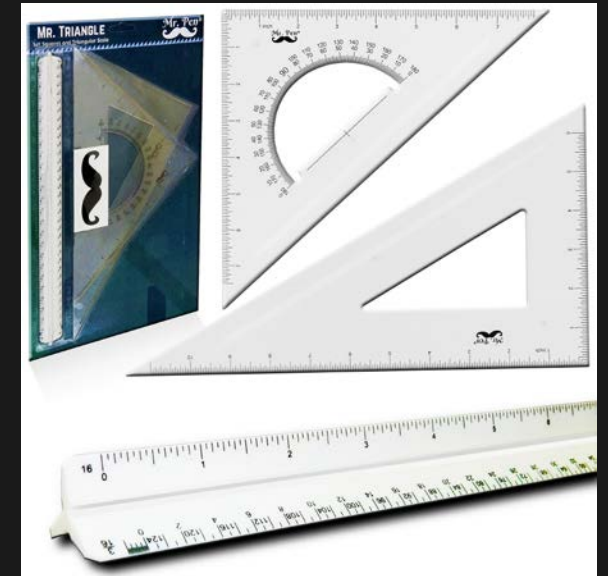
The diagram consists of two white arrows pointing to the right, set against a black background. The first arrow is on the left and contains the text 'Lead designer creates PDF instead of Office Engineer scanned the plan set'. The second arrow is on the right and contains the text 'E-Construction (Construction Bureau) copies the PDF into CAMMS'. The arrows are connected by a small white rectangular block.

E-Construction
(Construction Bureau)
copies the PDF into
CAMMS

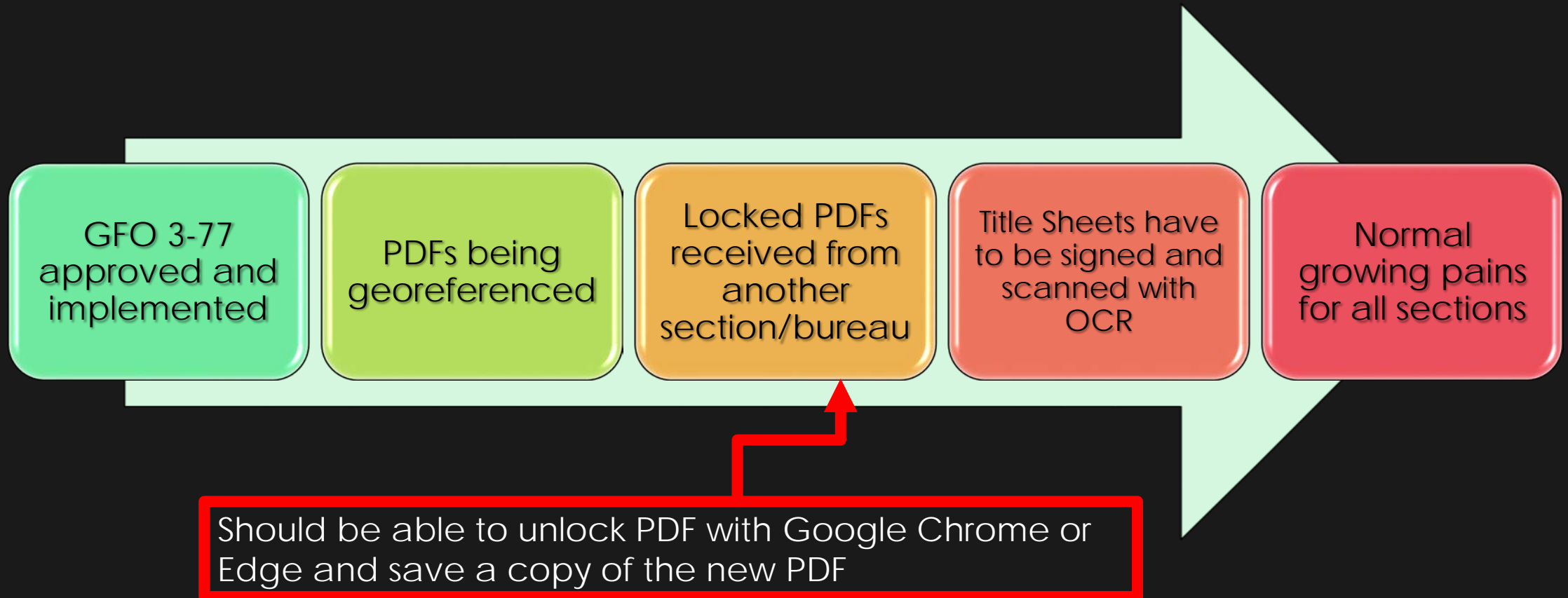
GFO 3-77 (Benefits of using source PDF)



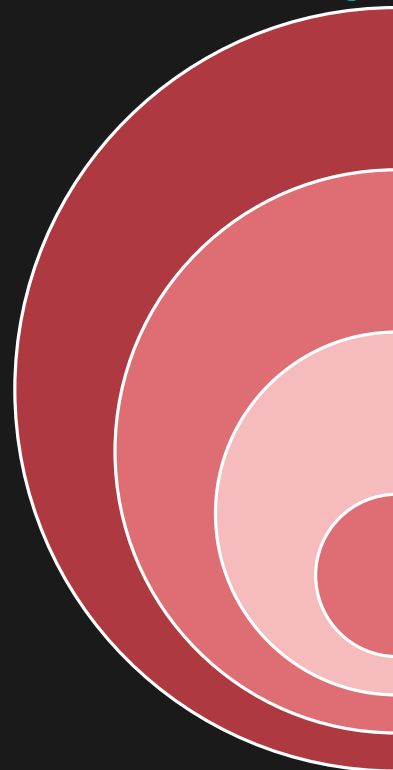
What E-Plans Could Eliminate



What roadblocks are in the way?



In Summary



E-Plan submittals are the future
InterPlot Organizer is a useful tool to help generate E-Plans but may require some troubleshooting
E-Plans would not affect the lead designer plan creation process if already batch plotting
GFO 3-77 will affect multiple bureaus but has multiple benefits

Questions?

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