Bulletin No. TC 7
File: Technology

Bulletin

PDF Editing Utilization for the Mechanical Contractor

This Management Methods Bulletin was developed as a project for the Advanced Leadership Institute (ALI). Members of Team 5 who researched and prepared the bulletin were: Robert M. Bolton of Arden Building Companies, LLC (Pawtucket, RI), Rodney J. Foley of North Mechanical Contracting, Inc. (Indianapolis, IN), Alastair J. Mathison of Limbach Company LP (Garden Grove, CA), Jason A. Now of Ahern Fire Protection, a division of J.F. Ahern Co. (Fond du Lac, WI), and Mark Schutte of Adrian Mechanical Services (Adrian, MI)

This bulletin shows how one contractor has used PDF editing software (in this case, Bluebeam) to handle a series of tasks and processes within that company. This bulletin is not a recommendation for any specific PDF editing software.

INTRODUCTION

Throughout the fast-paced construction world, embracing advancements in technology helps us to be more competitive and increases our efficiency as we service our customers.

From the initial exchange of documents at bid time, to the award of the project, through the submittals/approval processs, to preparation of shop drawings for installation and finally to the closeout of the project, contractors are bombarded with drawings, drawing revisions and additional paperwork associated with executing the work for the project.

The exchange of documents in the form of .pdf files is a standard among our industry and others across the country. Bluebeam is a .pdf creation, mark-up and collaboration tool used by many architectural, engineering and construction firms, and the effective use of the software can result in cost savings from paperless document exchange, savings in printing and shipping fees, labor hours saved throughout the plan review process and faster access to current documents for project staff, including those in the field. While .pdf software has long been used as a common format for electronic sharing of documents, the increasing ease and speed of use, along with additional functionality, such as online collaboration, document comparison and search capability, make it ever more effective in our industry.

Several versions of this software are available providing differing software functionality. At the end of this bulletin, we have included a pricing schedule for several versions of this software along with the associated maintenance costs

and upgrade costs.

- Bluebeam Revu (Standard)
- Bluebeam Revu (CAD)
- Bluebeam Revu (Extreme)
- Bluebeam Revu (IPad Version)

While Bluebeam has a vast array of features, the scope of this bulletin was limited to Bluebeam's editing and collaboration capabilities. It provides an overview of the software and highlights its editing and collaboration capabilities in particular.

Bluebeam Revu is primarily an editing software. However, certain analytic tools are included in the software, such as built-in measurement tools and the ability to overlay multiple documents. Bluebeam will even automatically highlight the differences between two document revisons on a project. This is particularly useful when comparing a later issued drawing to its previous version when no revision clouds of the changes have been provided.

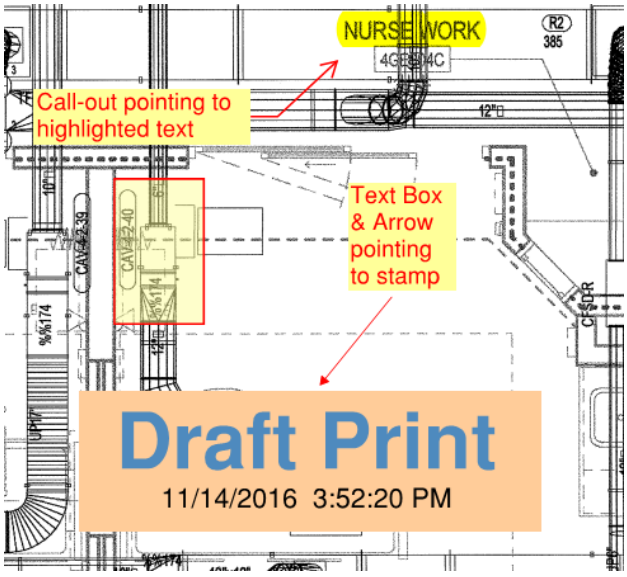
The capabilities of the software will be broken into the following main categories:

- Document Editing and Mark-ups
- File Editing and Search Functions
- Projects
- Sessions

DOCUMENT EDITING AND MARKUPS

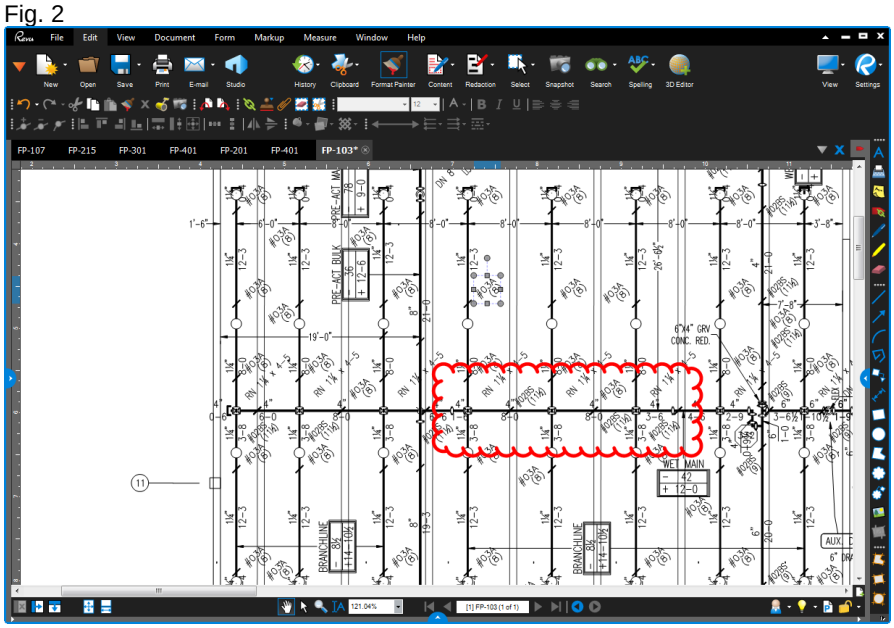
Bluebeam provides a means of editing an electronic document in any way that a hard copy of that same document might be edited. This includes the addition of shapes, lines, arrows, highlights, text boxes, callouts and stamps (see Figure 1). In the construction industry, such markups can be electronically transmitted, which improves the speed of communication.

Fig. 1



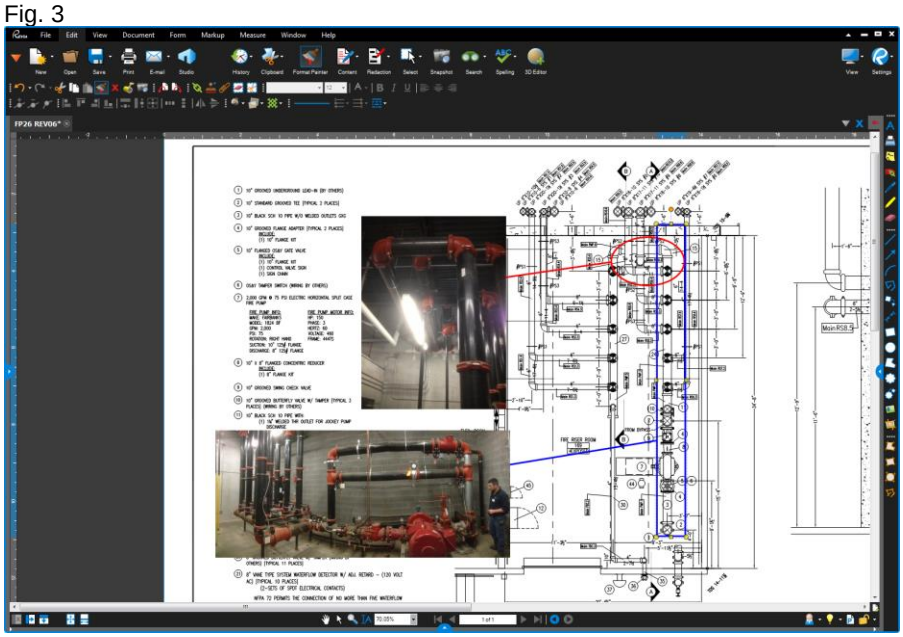
Clouds: Document revision clouds for example are traditionally used to identify either revisions to documents or the location that changes will need to be made (Figure 2). This type of communication may be necessary in both the submittal and construction phase of the project. In this way, changes are communicated clearly and unnecessary rework is avoided.

Fig. 2



Pictures/Photos: Attaching pictures to a document provides a means of indicating progress or identifying problems that can be shared with others, which expedites resolution (Figure 3)

Fig. 3



Headers and Footers: Headers and footers can also be automatically added to documents. This is particularly useful in the preparation of submittals or any other letter size document.

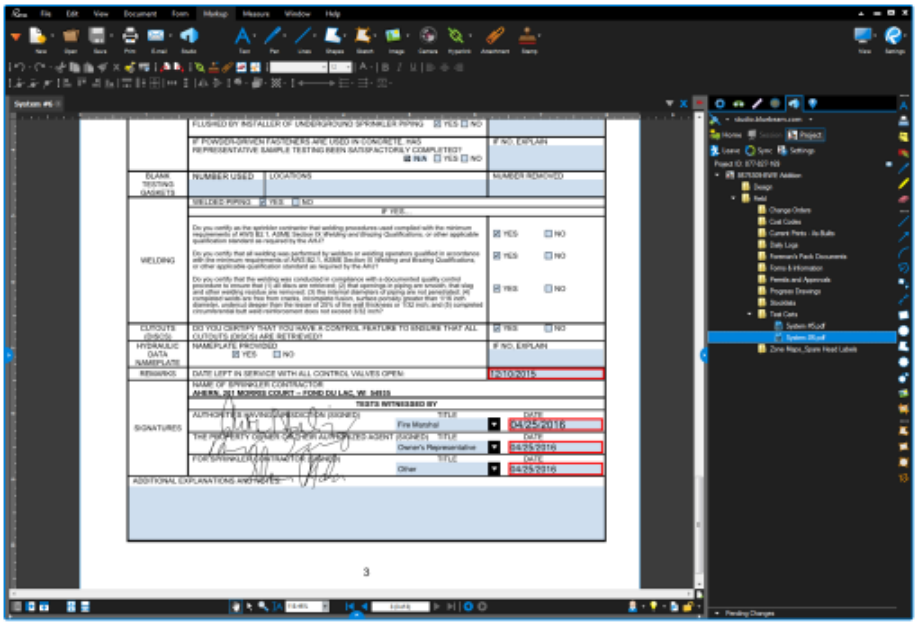
Mark-up Summary: All mark-ups are listed in the summary window. The summary shows each mark-up type, lists the page label, author, date, and comments. Other features of this mark-up summary include:

- Filtering by mark-up type, for example, by author
- Assigning a status to each mark-up (ie., Rejected, Deleted, Accepted, etc.)
- Assigning custom headers in the mark-up summary (i.e.,ball-in-court, etc.)
- Creating summary reports in various file formats

This functionality allows for collaboration of multiple parties during the review of any document.

Document Signatures: **Bluebeam Extreme** enables the creation and customization of .pdf documents within the software. The software also has the option, when using a tablet (IPad), to embed signatures into the documents (Figure 4). For instance, upon completion of a fire protection system installation, testing certificates can be signed by both the Authority Having Jurisdiction and the insurance company representative.

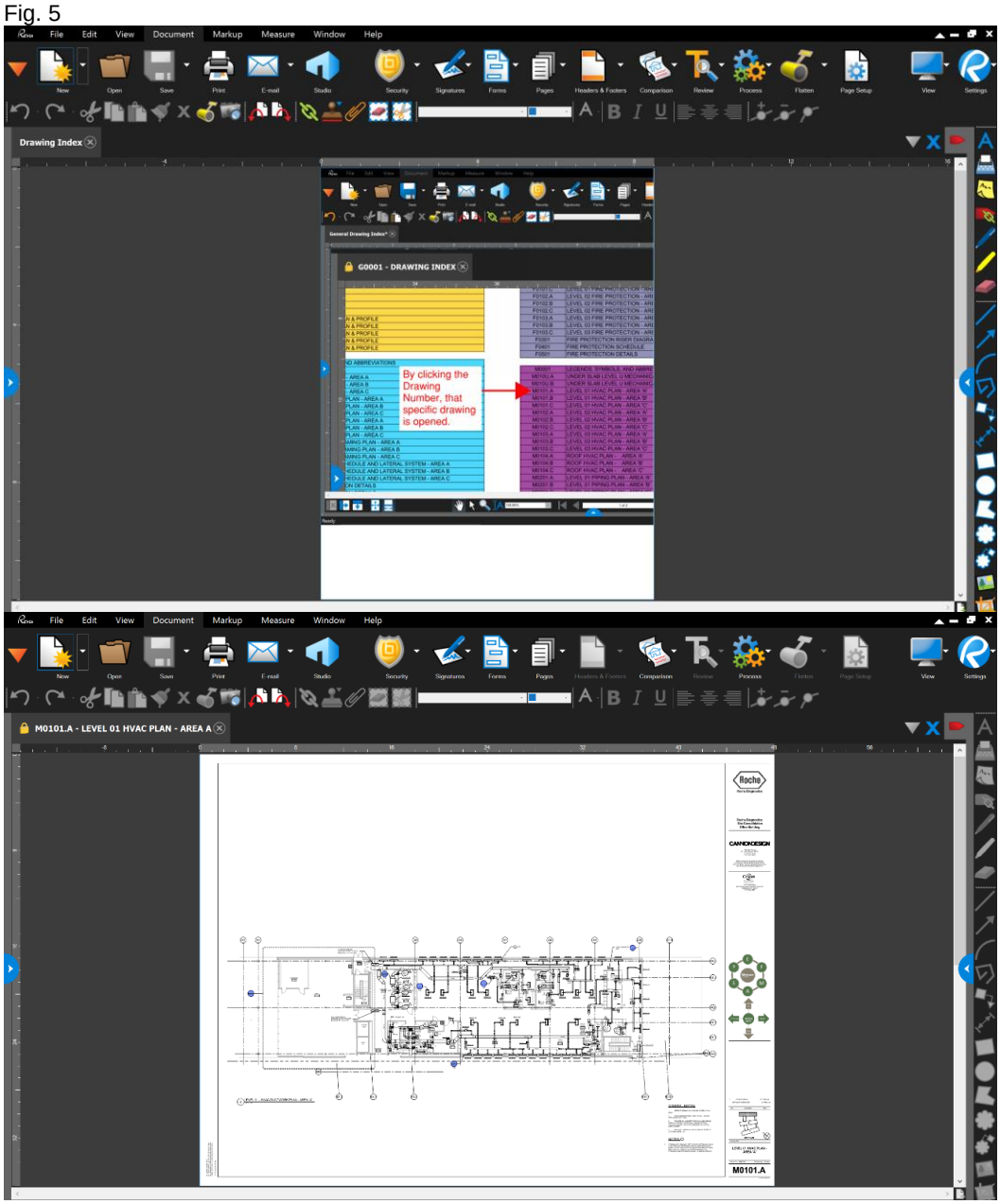
Fig. 4



Flattening: When all edits have been made, the documents can be “flattened,” which means that previous edits can no longer be modified.

Batch Linking: Batch linking is the automated process of inserting links between multiple documents for quick navigation through entire sets of drawings, specifications, contracts or any other .pdf files. Entire sets of drawings—including MEP, Structural, Architectural, Civil, etc.—can be linked. After the batch linking process is complete, the links will be highlighted. When the highlighted link is selected or “clicked,” the user will be redirected to the referenced drawing (Figure 5). This also works on index sheets where each page listed a link is created.

Fig. 5



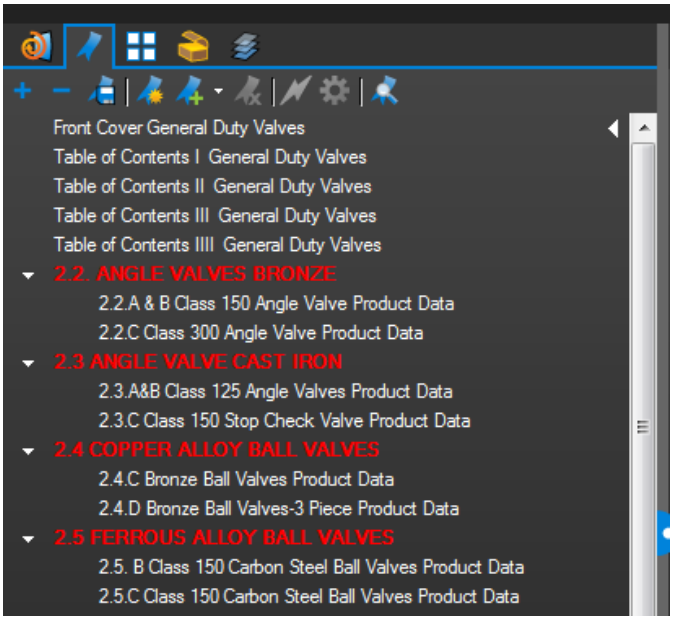
FILE EDITING AND SEARCH FUNCTIONS

In addition to providing a means of modifing the electronic document, Bluebeam allows modification to the file itself.

File Conversions: Bluebeam can assist in converting other file formats to .pdf. The print quality used during this process can be adjusted, which affects the size of the file created. The scanned .pdf documents can also be converted to TIF, JPG, BMP, etc. These .pdf files can also be converted into Microsoft editable documents.

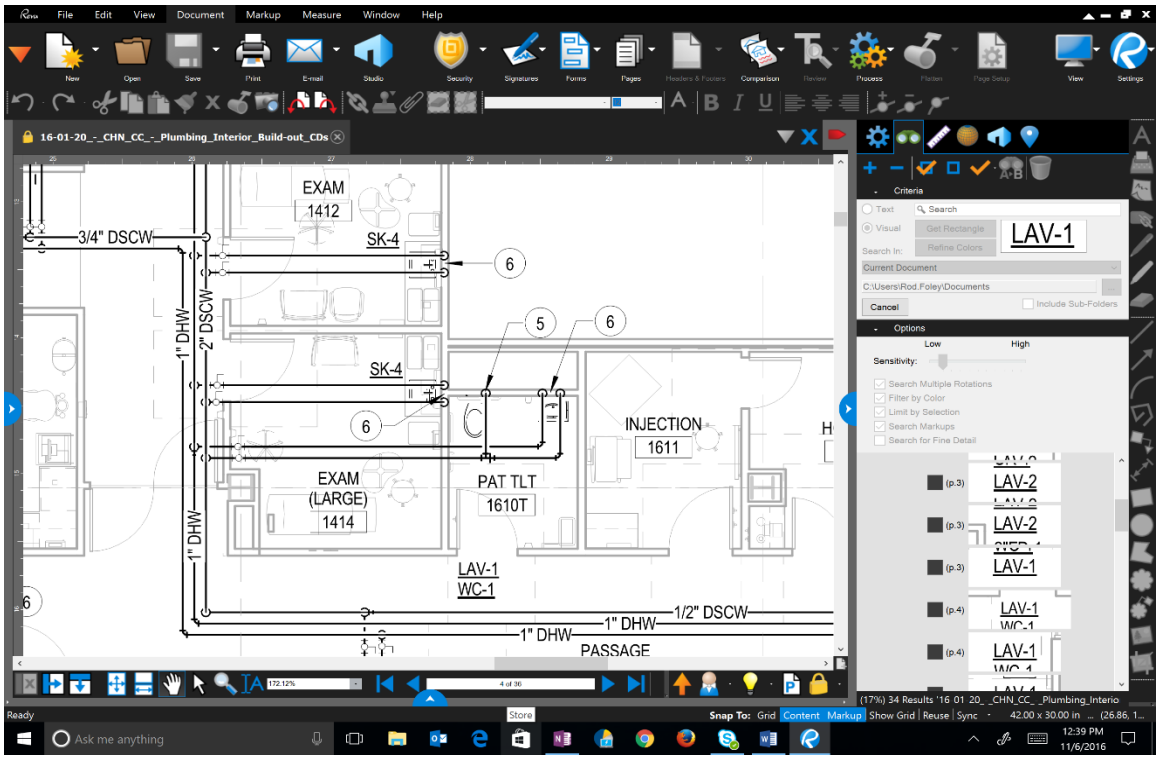
Bookmarks: Bookmarks can also be added to .pdf files, which significantly eases navigation through larger documents (Figure 6).

Fig. 6



Search Function: Bluebeam can be used to search .pdf files for text or geometry (Figure 7). A list with a link to the associated page is generated for each instance. An added benefit to this generated list is that the quantity of items found is given. An example would be searching a plumbing set of drawings for a fixture type, such as SK-1 resulting in a quantity take-off. Scanned documents can also be converted to searchable text using OCR (Optical Character Recognition), though the quality of the scan can impact the success of this conversion.The search function also captures CAD and/or Revit details such as room numbers even when the text is rotated. Visual searches can also be conducted by “windowing” a specific item. The geometry of the items in the window will be analysed and the document searched for similar geometries.

Fig. 7



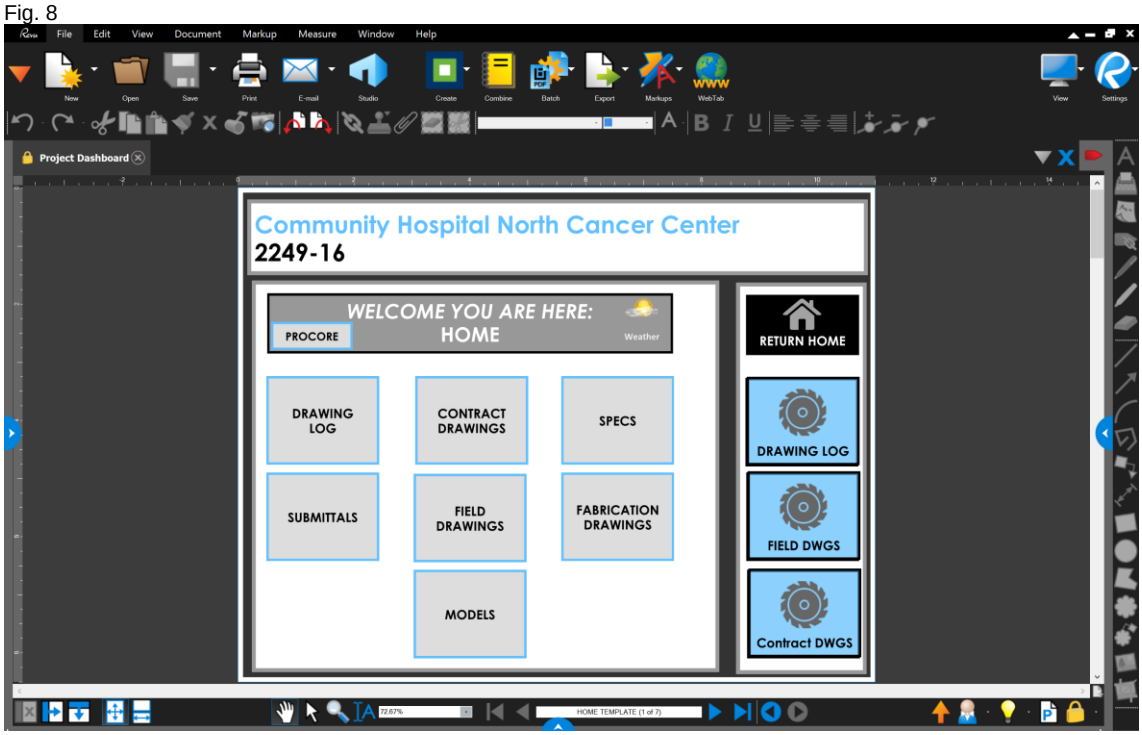
PROJECTS

Document Control: Bluebeam enables documents to be stored in “the cloud” and shared in an organized manner ensuring that all parties have easy access to the latest documents. A file folder structure can be developed and utilized that matches a companies’ standard structure. Any file type can be uploaded to these folders. For instance, coordination model files, robotic layout files, excel and word documents, or any other desired file type. These files types cannot be opened in Bluebeam however, the native file application will launch when these files are opened (Figure 8).

Currently Bluebeam provides unlimited file storage (size or quantity). Once files are uploaded they can be “checked out” which locks the file so that the document cannot be edited by others. Files may also be updated or replaced. When the update function is used, a history of the previous versions is maintained in the cloud. Upon opening the file, the latest document will automatically open. Previous versions can be opened for review at any time. The revision history function will log the date, time, user and any comments entered. Unlimited users can be granted access to any given project.

Digital Dashboards: Standardization of digital dashboard (quick links) allows for easy and intuitive navigation of project files in lieu of a traditional folder structure. These dashboards can be standardized across projects so that Project Managers and Foremen know how and where to quickly find data.

Fig. 8



Sessions:

Bluebeam enables multiple users to join a "session" in order to collaborate in real time.

Much like an online meeting place, the document opened within the session by one user can be seen by all others. Mark ups, text, bubble clouds, pictures, etc. can be seen as they are added. This is a useful communication tool

Note: All costs are subject to change.

used to increase clarity between office and field. All markup activity is tracked and recorded.

Summary and Integration Cost:

Bluebeam comes in the four packages listed below with an increase in cost associated with the additional functionality provided. All costs are listed as of September 2016 and include cost of the software only.

BlueBeam REVU - 2016			
Current Pricing Structure - Per Seat (10-24 Seats)			
	Price	Maintenance / Year	Upgrade Cost
Revu Standard	$ 219	$ 43	$ 109
Revu CAD	$ 252	$ 49	$ 127
Revu Extreme	$ 307	$ 60	$ 153
Revu IPad	$ 10		

Introducing Bluebeam to an organization is straight forward and the learning curve is relatively shallow - the basic functions of the software are logical and user friendly.

Bluebeam is a tool foundationally designed for the editing of .pdf documents, but the many additional features, a sampling of which have been described above, make it a far more powerful tool which is becoming increasingly common place in our industry.

A Final Word…

There are many other PDF editing software providers, and as with most technologies, the field of providers is expanding rapidly.

Some of the providers include:

PDF Studio 10 - https://kbpdfstudio.qoppa.com/?p=2881
PaulTheCad - https://paulthecad.com/product/drawing-compare/
PlanGrid - https://www.plangrid.com/
Procore - https://procore.com/
Adobe Pro DC - https://acrobat.adobe.com/us/en/acrobat.html?promoid=C12Y324S&mv=other

Should your company decide to invest in PDF editing software, investigate multiple options for a software provider. Features and costs can vary significantly. As with any other technology investment, due diligence is important.