

## 1. TIMBER BORING TEMPLATES

### 1.1. PDF Editing Software

The Timber Boring Template layouts were created in Adobe Acrobat and all mark-ups were created in Bluebeam Revu.

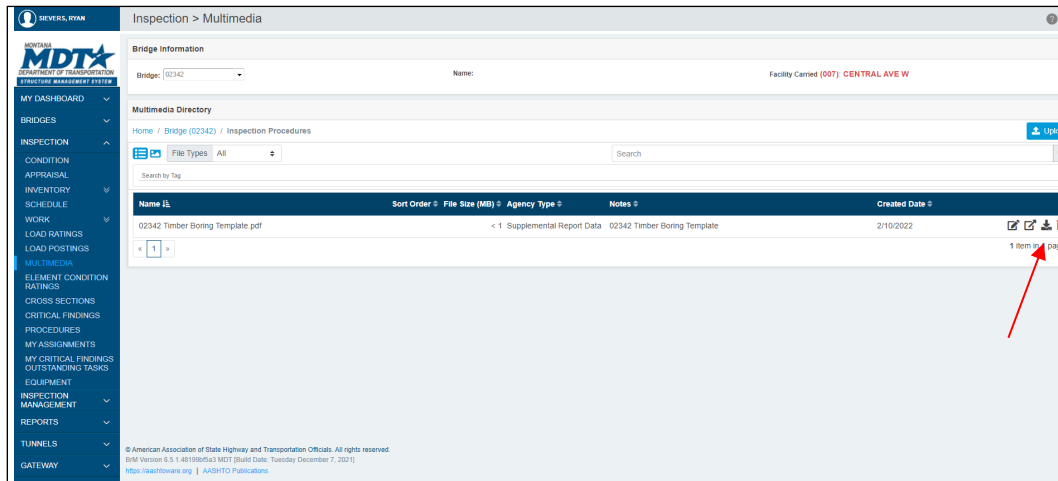
#### 1.1.1. Bluebeam Revu

Bluebeam Revu is the recommended software to complete timber inspection mark-ups since it has capabilities to flatten individual mark-ups and sections of pages.

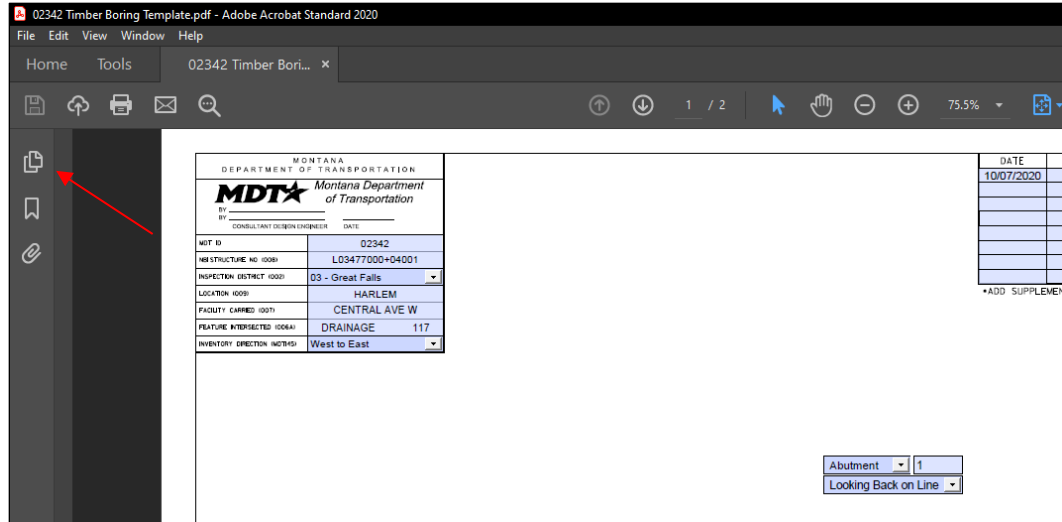
#### 1.1.2. Adobe Acrobat

Adobe does not display data for duplicated fields over duplicated pages. In order to see all mark-ups and fillable fields in Adobe, extract the document into individual pages. How to open Timber Boring Templates in Adobe:

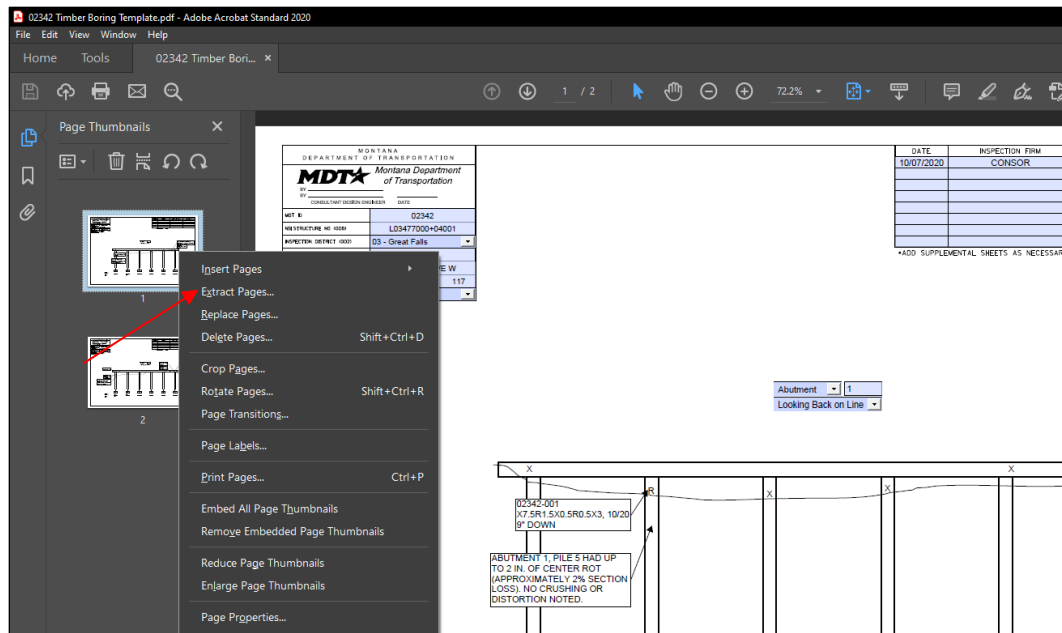
1. In BrM go to “Inspection > Multimedia > Bridge (top link) > Inspection Procedures”, find the file “0XXXX Timber Boring Template.pdf”.
2. Download “0XXXX Timber Boring Template.pdf” to your computer.



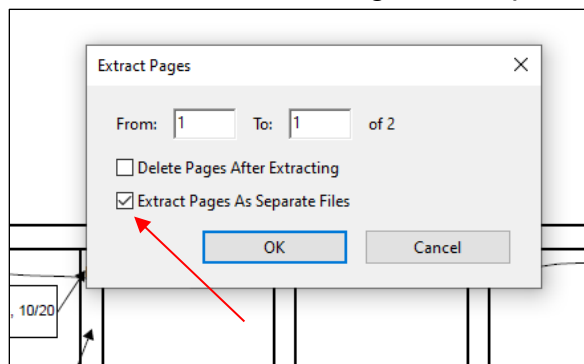
3. Open “0XXXX Timber Boring Template.pdf” in Adobe and on left side of screen click the multiple page button to open up Page Thumbnails (By default, thumbnails are turned off,. To turn them on go to “Edit > Preferences > General” and select “Enable PDF thumbnail previews in Windows Explorer.”)



4. Right click on the pages and select “Extract Pages”.



5. Select box for “Extract Pages as Separate Files”.



6. Choose destination for the extracted pages to be saved and click “Select Folder”.
  - a. The destination selected will have as many PDF documents as there are pages in the original downloaded document titled “0XXXX Timber Boring Template 1/2/3/etc”. Each page will appear as a separate PDF.
  - b. Each individual page will now show all mark-ups that were completed in Bluebeam Revu.

## 1.2. Style Guide

All font is Size 10 Helvetica and all text needs to be capitalized. The text color will correlate to which row is used in the top, right corner of the template.

Row	Color	Red	Green	Blue	Hue	Sat	Lum
1	Black	0	0	0	160	0	0
2	Red	255	0	0	0	240	120
3	Green	64	170	85	88	109	110
4	Blue	0	0	255	160	240	120
5	Pink	255	0	255	200	240	120
6	Orange	255	85	0	13	240	120
7	Purple	128	0	128	200	240	60
8	Blue-Green	64	128	128	120	80	90

### 1.2.1. Adjusting Existing Comments

1. Whenever the current inspector agrees with a previous comment, they shall add the comment “X/XX/XX – NO CHANGE” to the side of the comment in the appropriate color.
2. If a comment needs to be changed due to differing conditions, then the text color within the textbox should be changed to the appropriate color for that inspection year. The comment “X/XX/XX – *DESCRIPTION OF WAY COMMENT WAS CHANGED*” should be added to the side of the comment in the appropriate color.
3. If a different reading is found at a boring location compared to previous inspections, then the boring notes should be changed and the text color within the textbox should be changed to the appropriate color for that inspection year. The comment “X/XX/XX – *INTERNAL DECAY GREW FROM X IN. TO X IN.*” should be added to the side of the comment in the appropriate color.

4. If comments or boring information is no longer valid due to a permanent repair such as an FRP wrap on a decayed pile or a decayed pier cap being replaced then all comments can be deleted. A comment such as “X/XX/XX – *TIMBER CAP REPLACED SINCE 2022 INSPECTION*” should be added to the side of the comment in the appropriate color.

### 1.3. Using Blank Page

If a substructure unit on a bridge requires more information than what can fit on a standard template sheet, then a Blank Page may be required. These Blank Pages have been most frequently used on timber pier caps with significant decay and section loss, or on substructure units with multiple retrofits.

### 1.4. Flattening the Document

Flattening the document makes markups a permanent part of the PDF. This will ensure the markups will be seen the way inspector intended them to be.

Items that should be flattened:

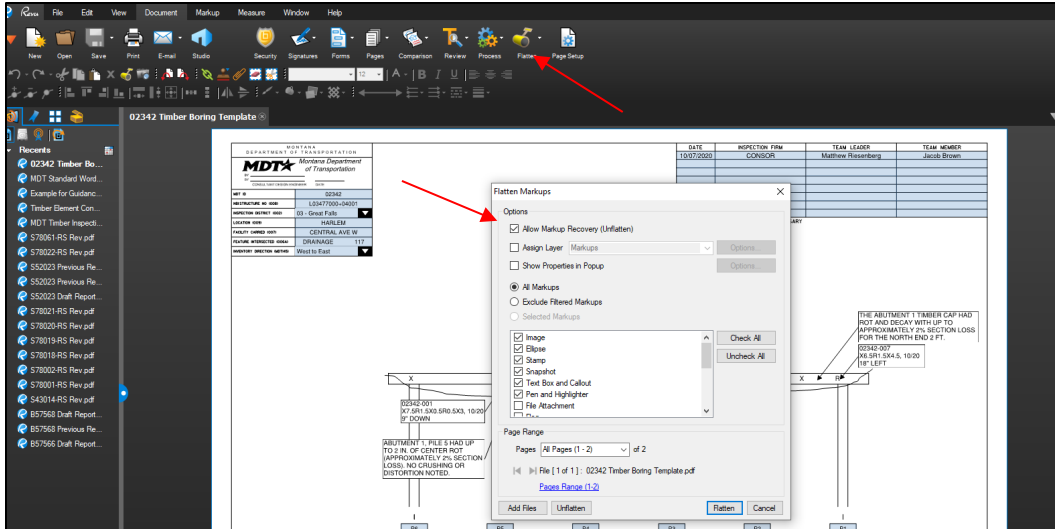
1. Groundline or waterline
2. Previous and current boring locations demarcated with X’s or R’s
3. Structural elements added to templates, including splice caps or additional piles
4. Permanent retrofits, including FRP wraps on piles or steel strap connections from piles to caps

Items that should not be flattened:

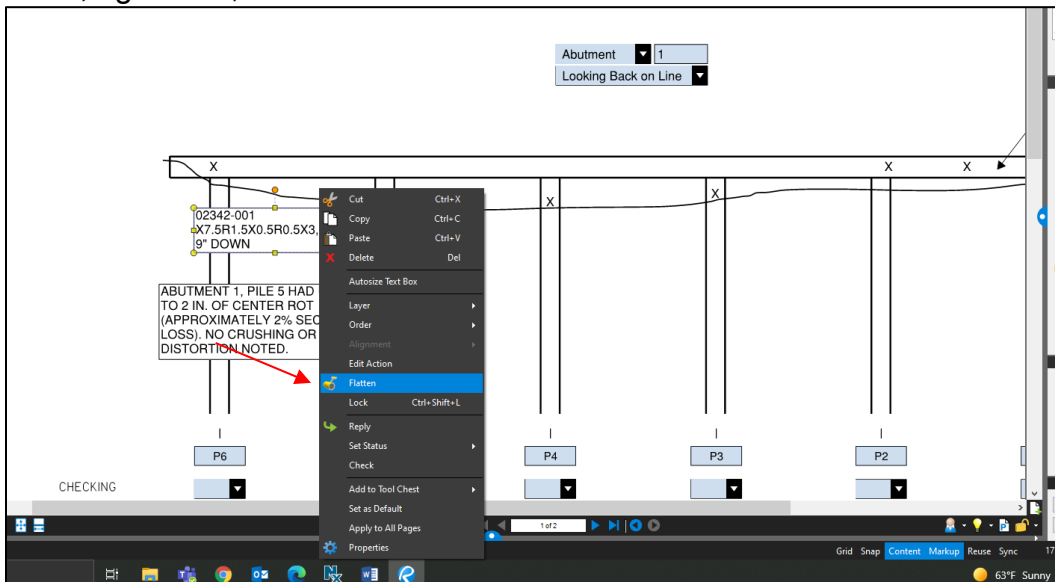
1. Comments
2. Inspection specific boring information:  
*0XXXX-X-01*  
*X2R8X2, 10/20*  
*32” DOWN*

#### 1.4.1. Bluebeam

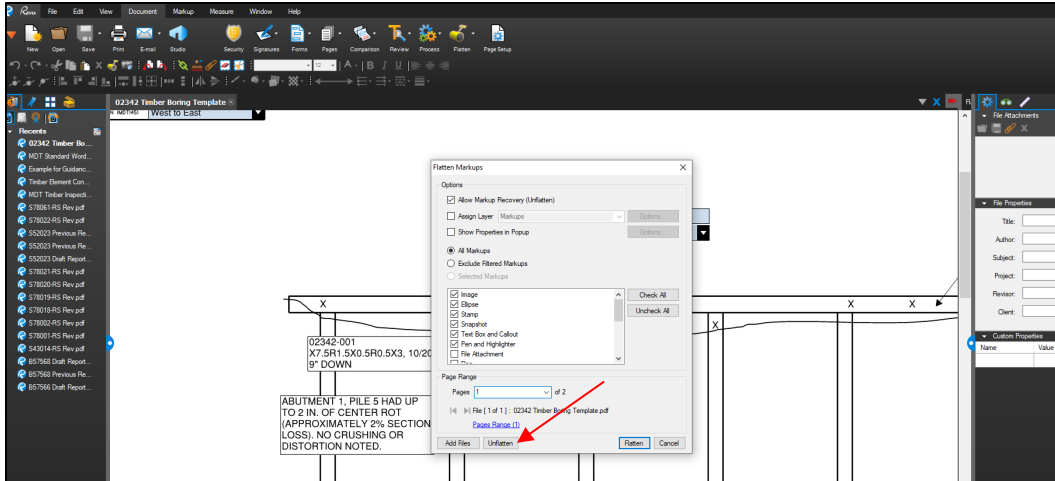
Before flattening mark-ups in Bluebeam, ensure that the correct settings are enabled. Click on the Flatten Button under the Document Ribbon. The top option titled “Allow Markup Recover (Unflatten)” should be selected.



Only use the Flatten Button found under the Document Ribbon in Bluebeam if flattening an entire page. To flatten individual items on a page, select the desired items, right click, and select “Flatten”.



If problems are noted with flattened items that need to be corrected before submittal, unflatten by selecting the Flatten Button under the Document Ribbon, selecting the page numbers that need to be unflattened, and select the “Unflatten” button at the bottom of the page.



## 1.5. Uploading the Template to BrM

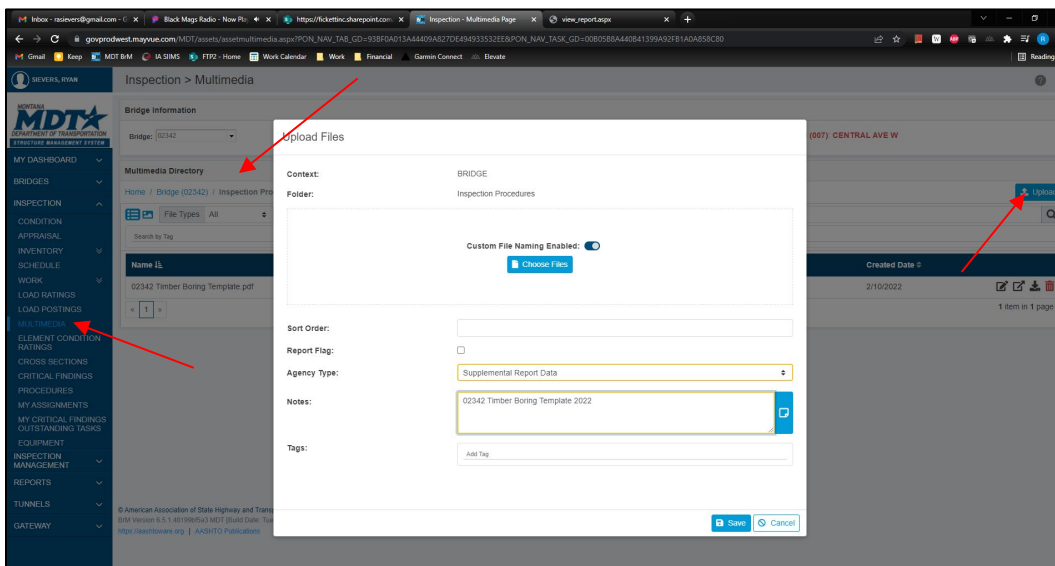
Once the report has been reviewed and is ready to be “locked”, the PDF will need to upload the Timber Boring Template in two separate locations.

### 1.5.1. Location 1: Timber Boring Template Fillable Form

This step will require the Timber Boring Template to have all appropriate mark-ups complete and be properly flattened per Section 1.4.1. Upload the PDF to the bridge specific Inspection Procedures folder in BrM:

BrM > Inspection > Multimedia > Bridge (0XXXX) > Inspection Procedure

Upload the template and follow the naming convention of “0XXXX Timber Boring Template (XXXX “year”)”

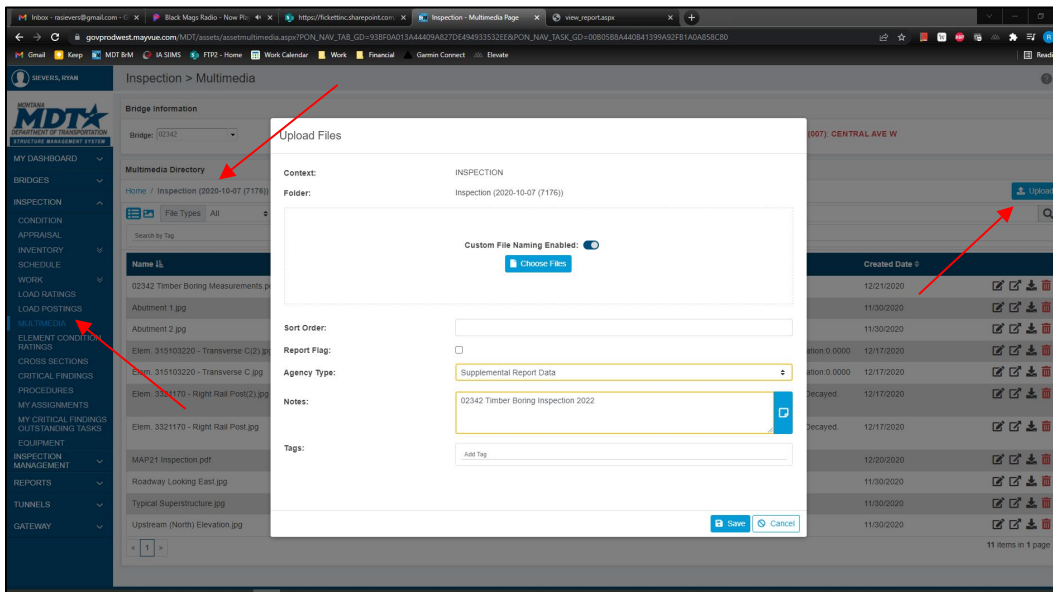


### 1.5.1. Location 2: Timber Boring Template

A flattened version of the Timber Boring Template will also need to be uploaded to the inspection specific folder in BrM. This involves printing all pages of the template to PDF, which will flatten all fields.

BrM > Inspection > Multimedia > Inspection (XXXX-XX-XX (XXXX))

Upload the template and follow the naming convention of “0XXXX Timber Boring Inspection (XXXX “year”)”



### 1.6. Timber Boring Inspections

In addition to standard visual and sounding methods of inspecting timber, use of a Resistograph to obtain full cross section evaluations is required at the locations listed below. If necessary, for logistical purposes or equipment limitations, the angles and locations listed below may be adjusted at the inspector’s discretion. Minimize the adjustment of the angles and locations necessary to obtain a valid boring.

1. Drill each timber pile with a previously reported CS3 and CS4 decay defect. It may be required to dig up to 12 in. below the groundline to determine extents of decay.
  - a. All piles that are noted with CS3 or CS4 decay should be re-drilled by rotating the location of the drill tip by 30-45 degrees to ensure decay and not ‘chasing checks’.
2. Drill additional random piles beyond the CS3 or CS4 piles equal to a minimum of 10% of the total pile quantity.

3. Drill all timber caps with a previously reported CS 3 or CS4 decay defect. Conduct as many borings as necessary to determine the limits (length of cap) of decay in the cap. See Section 1.7: Timber Cap Boring Inspections for additional information on pile cap boring.
4. Drill additional locations on timber piles, caps, or girders that visual or sounding inspection methods indicated possible decay.
5. Perform additional borings to locate the limits of decay (vertically on piles, horizontally on caps and girders) on any element where Condition State 4 decay has been confirmed. If decay is found at the groundline of a pile, then digging down 12 in. below the groundline to confirm decay will be required, if feasible.
6. Drill all timber piles that have been repaired with steel or FRP jackets, at least one boring above and below the FRP jackets, if feasible. Do not bore through jackets. It is not required to expose timber piles below FRP jacket sections that extend into the ground unless a failure or other deterioration is suspected. It is not required to bore the top of piles that have less than 6" of exposed pile between the top of FRP jacket and cap.

A resistograph with the ability to digitally record graphs is required in the following situations:

1. The internal decay on a timber pile differs from previous resistograph reading.
2. Internal decay is found on a timber member where decay was not previously found.
3. One section of cap with decay, See Section 1.7: Timber Cap Boring Inspections for additional information on pile cap boring.

Physically mark the location of each boring done with a brightly colored green or red grease pen with an "X" (green) for no rot found and an "R" (red) for boring that indicate rot.

After completing each boring, seal all bore holes with either a treated wooden dowel or silicon caulk. If the resistograph is designed as self-sealing, then sealing is not required.

Process or review all boring information at the bridge site prior to leaving the site to identify anomalous borings. Re-bore any location or element that has anomalous borings.

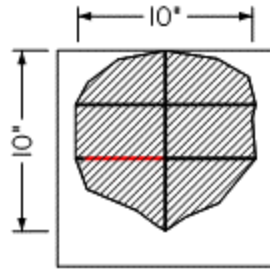
### 1.7. Timber Cap Boring Inspections

If decay is suspected or found during hammer sounding or boring the ends of the timber caps, then pattern drilling will be required to find the extents of the decay.

1. Use resistograph to bore timber cap along the neutral axis to find extents of decay.
2. Mark out areas to pattern drill, which will include areas of decay around piles, areas where cap is bulging or crushing, or where there was a significant change in section loss when bored at neutral axis. It will be necessary to chase the decay horizontally from the end of the cap with rot. It is recommended that pattern drilling occur on either side of each pile until sound cap is obtained.



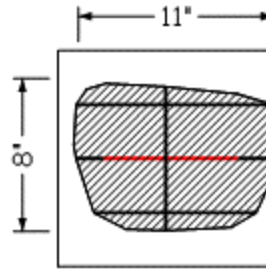
3. Drill the cap at the mid-point and quarter-points on the vertical face of the cap (3, 6, 9 in. measured from top of 12 in. tall cap) and vertically through the bottom face of the cap, if accessible



18" RIGHT

2019 BORINGS  
6 IN. - X15R4.5X6  
ASSUMED SECTION LOSS = 11%

2021 BORINGS  
3 IN. - X1R10X1  
6 IN. - X1R10X1  
9 IN. - X12  
VERT - X2R10  
ASSUMED SECTION LOSS = 55%



64" RIGHT

2019 BORINGS  
6 IN. - X2.5R7.5X2  
ASSUMED SECTION LOSS = 30%

2021 BORINGS  
3 IN. - X1R11  
6 IN. - X1R11  
9 IN. - X2R9X1  
VERT - X2R8X2  
ASSUMED SECTION LOSS = 61%

Pattern drilling of caps will give MDT an accurate depiction of the section loss throughout a timber cap. A resistograph with the ability to digitally record graphs is required at a minimum of one pattern drilling location on each cap where pattern drilling is utilized.

All font is Size 10 Helvetica

- 2nd ROW TEXT COLOR
- 3rd ROW TEXT COLOR
- 4th ROW TEXT COLOR
- 5th ROW TEXT COLOR
- 6th ROW TEXT COLOR
- 7th ROW TEXT COLOR
- 8th ROW TEXT COLOR

