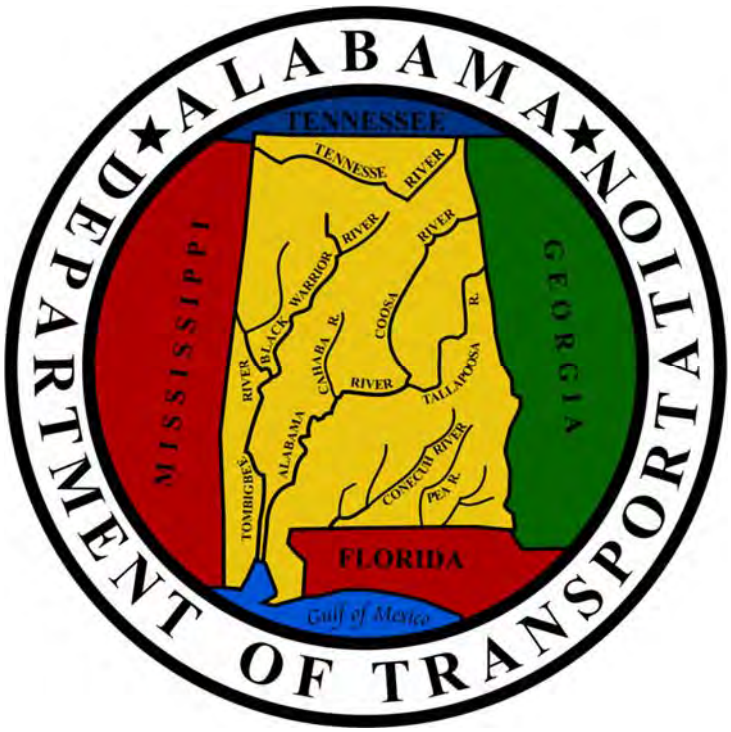
Alabama Department of Transportation
Maintenance Bureau

Bridge Management System



BrM
Cross Section Module
Users Guide

October 6, 2017

4.1 –Cross Sections Task

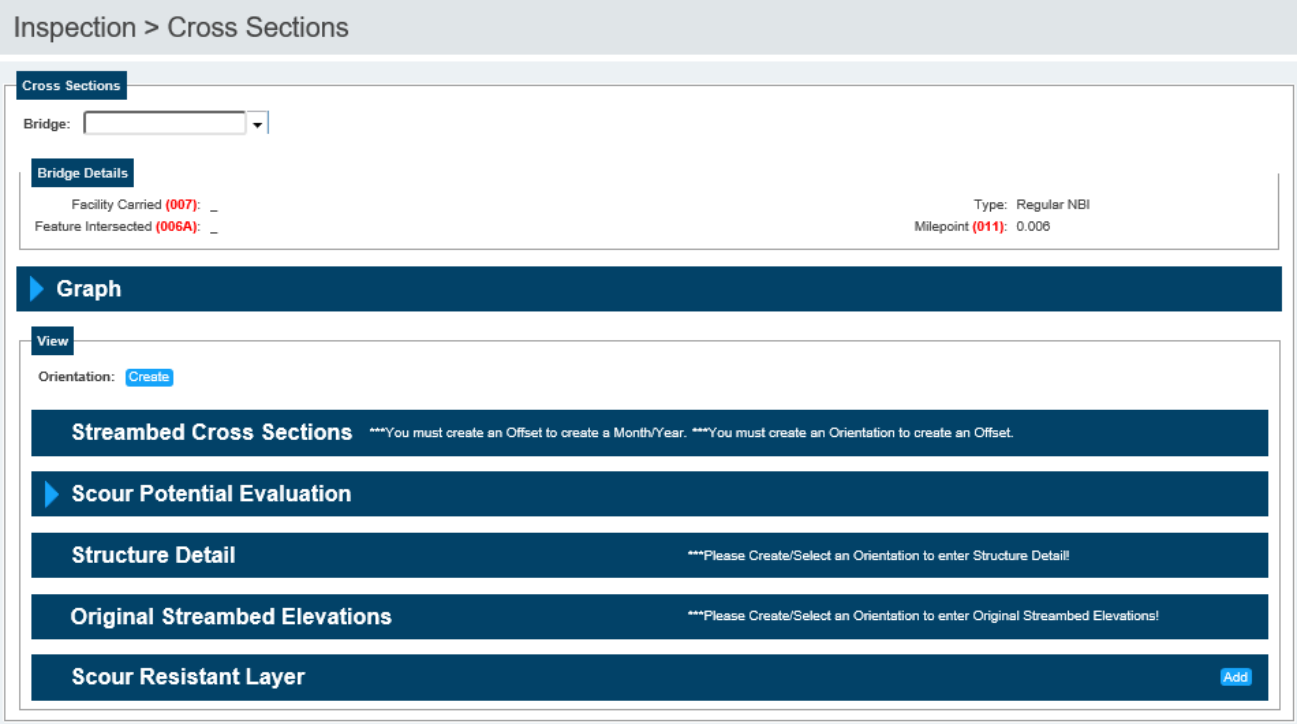


Figure 1

The *Inspection > Cross Sections* task (see Figure 1) allows the user to track and graph streambed cross sections relative to a structure and scour potential lines for the selected structure.

The following is a list of all panes on this screen and what should be done in each. A brief explanation of each is included.

Cross Sections

The **Cross Sections** task involves any information that is pertinent to the make-up of a structure. This panel consists of different **panes**. These panes include the **Graph** pane, **Streambed Cross Sections** pane, **Scour Potential Evaluation** pane, **Structure Detail** pane, **Original Streambed Elevations** pane, and **Scour Resistant Layer** pane.

Graph

The **Graph** pane contains the graph to view the details entered in the other panes below. The graph will update as information is entered in the other panes.

View

Cross section measurements are divided into views (left or right). For example, measurements may be taken on the left or upstream side of the structure and some on the right or downstream side. If the structure is skewed, the structure details may differ between the two sides. Thus, views keep the upstream measurements grouped and graphed relative to their structure details, while the downstream measurements are kept with their details. You will need to create at least one view for a structure to use the cross-section module on it.

Streambed Cross Sections

The **Streamed Cross Sections** pane is where groundline measurements are recorded during each inspection. It is typically filled in by bridge inspectors.

Scour Potential Evaluation

The **Scour Potential Evaluation** pane is for recording calculated scour depths for analyzed flood events. If no scour potential events are recorded, this pane will appear BrM blue with an **Add** button.

Structure Detail

The **Structure Detail** pane allows the user to draw and define the structure. When the **Structure Detail** pane contains data, it turns the color of that line. The color of the line can be changed to meet preferences.

Original Streambed Elevations

Many structures have the original groundline data included in their plan sets. This data can be useful when considering the effects of scour over the lifetime of the structure.

When data related to the **Original Streambed** is added, the pane will turn the color of the line on the graph. The color of the line can be changed to meet preferences.

4.2 – Structure Detail

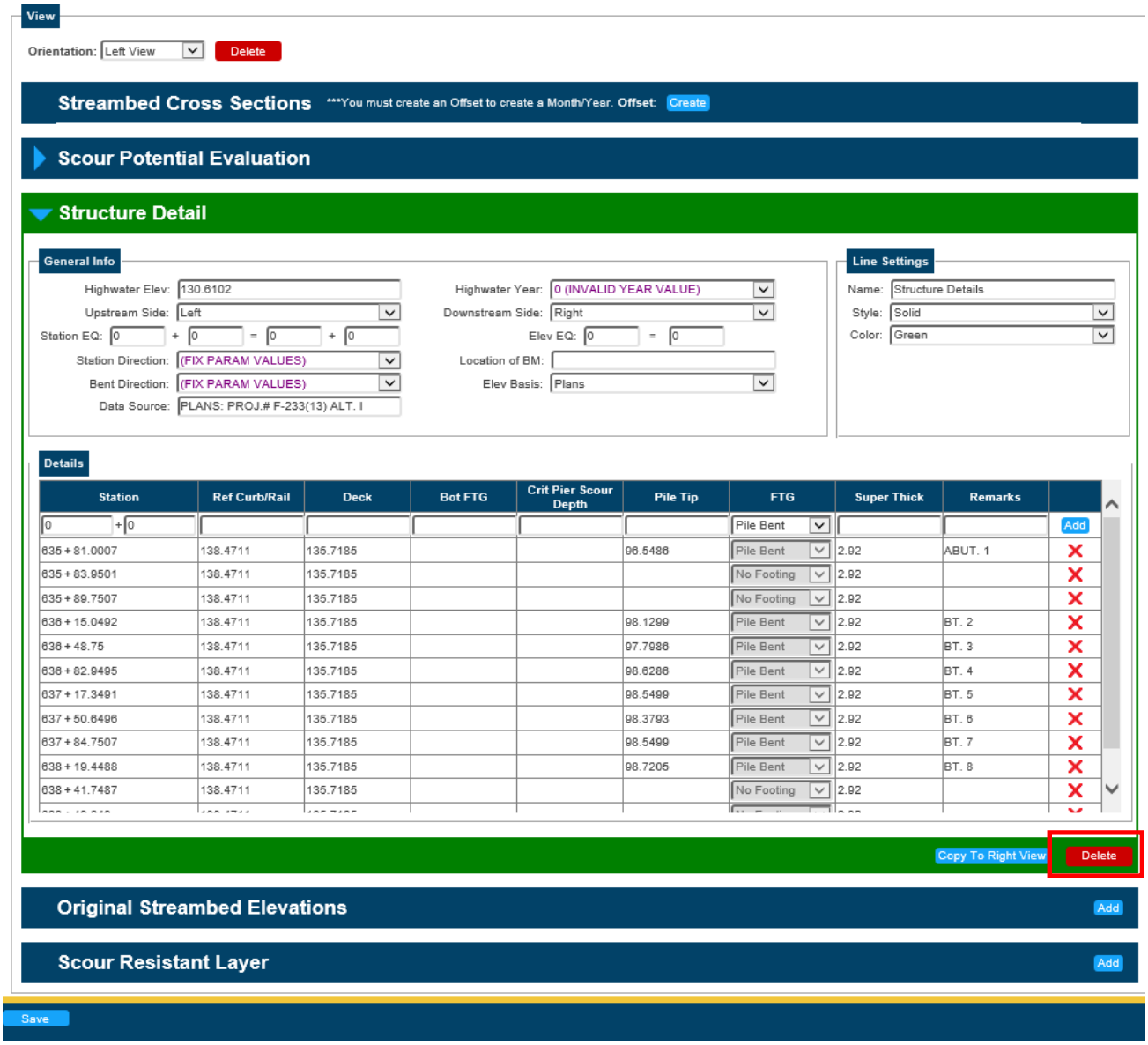


Figure 2

The Structure Detail pane (shown in Figure 2) allows you to enter the Structure Detail data so the elevation view of the structure can be included in the **Graph**. You may view, add, change, or delete structure detail data from this screen.

The **General Info** panel displays bridge hydrology information including highwater elevation and year, as well as a place to specify the upstream and downstream sides of the bridge.

There are two valid views (left or right) that can be specified for each structure in the **Orientation** drop-down menu located in the top left of the **View** panel. For each view of a structure, the station equation, station direction, bent direction, data source, elevation equation, location of the bench mark, and the elevation

basis can be entered. For each station along the structure, you may enter elevations for the top of reference curb/rails, top of deck, bottom of footings, critical pier scour depth, and pile tips. The type of footing and superstructure thickness along with any pertinent remarks regarding that station may also be entered. This information can be edited by selecting the field, or a line of information can be deleted using the ✕ icon on that row. You can delete entire views by clicking **Delete** (highlighted in red in Figure 2) in the bottom, right corner of the panel.

Note- Clicking **Delete** deletes the entire view. You will not be able to undo this.

The following is a list of all fields on this screen and what should be entered in each one. A brief explanation of each is included.

View Selection

Orientation:

This field (located in the top left of the panel) is used to identify the view of the structure detail information. The orientation of the bridge would be determined when traveling in the direction of the inventory route (increasing mile markers). The field contains the parameters below:

Left view - data is for the left side of the bridge (stations increasing in the direction of the route)
Right view - data is for the right side of the bridge (stations decreasing in the direction of the route)

General Info

Highwater Elevation:

This field shows the highest water elevation during the maximum known flood event at the bridge site.

Highwater Year:

This 4-digit field shows the year of the maximum known flood event at the bridge site.

Upstream Side:

This field specifies the upstream side of the structure. It is referenced in the inventory route direction. The field contains the parameters listed below:

Unknown – the upstream side is not known
Left – the upstream side is the left side of the bridge
Right - the upstream side is the right side of the bridge

Downstream Side:

This field specifies the downstream side of the structure. It is referenced in the inventory route direction. The field contains the parameters listed below:

Unknown – the downstream side is not known
Left – the downstream side is the left side of the bridge
Right - the downstream side is the right side of the bridge

Station EQ:

This field is used to capture a station equation which may be required to reference all horizontal information from a common reference point. If the beginning of the bridge was assumed to be at station 1 + 00.00 and plans were later discovered showing the beginning of the bridge at station 5 + 42.68, then a station equation could be used to correct the assumed station. This allows for the historical reference material (i.e., plans and pile driving records) to be referenced appropriately to the bridge plot. It is important to be aware that the station equation may be required for each section of data such as structure details, original streambed elevations, and streambed cross sections, so that they are all correlated by a common reference point. The station equations should be completed as required for the bridge to plot correctly.

Station Direction:

This field is used to capture the station direction determined when traveling in the direction of the inventory route (increasing mile markers). The field contains the parameters below:

Increasing
Decreasing

Bent Direction:

This field is used to capture the bent direction determined when traveling in the direction of the inventory route (increasing mile markers). The field contains the parameters below:

Increasing*
Decreasing

*The bent direction should always be increasing.

Data Source:

This field captures the source of the structure detail information. The structure elevations may come from "design" plans, "as-built" plans, or a field survey.

Elev. EQ:

This field captures the elevation equation which may be used to reference all vertical information from a common reference plane for plotting. If the bridge details are initially plotted based on an assumed reference elevation and later plans are located which show the actual elevations, the initial assumed reference elevation can be equated to the actual elevation based on the information from the plans.

For example, a crew goes to the field to gather bridge detail information and they set a reference point

with assumed elevations, such as 150.00 feet. Later, a different crew goes to gather streambed sounding information and they use the same reference point but assume an elevation of 100.00 feet. These plots can and must be put on a common reference line by keying an elevation equation. In this case, the elevation equation on the streambed soundings form would be 100.00 feet = 150.00 feet because the streambed soundings should be linked to the same elevation.

Be aware that an elevation equation may be required for each section of data such as structure details, original streambed elevations, and streambed cross sections, so that they are all correlated by a common reference point. The elevation equations should be completed as required for the bridge information to plot correctly.

Location of Benchmark (BM):

This field captures the location of the bench mark used for referencing the cross sections (ex. top of rail, from curb, from deck).

Elevation Basis:

This field captures the type of platform the elevations for the structure details are based on. The field contains the parameters below:

Code:	Description:
Assumption	Elevations are based on assumption. From some semi-permanent, fixed point, on or near the bridge, an elevation is assumed. All subsequent elevations for the structure are based on this "assumed" elevation.
US Geodetic Survey	Elevations are based on a U.S. Geodetic Survey bench mark or an Alabama Department of Transportation bench mark. This would be basically the same as elevations from the bridge plans except that plans might not be available on the structure, but a geodetic marker is conveniently close.
Plans	Elevations are taken from the bridge plans. In this case, the elevations are usually based on a permanent U.S. Geodetic Survey bench mark or an Alabama Department of Transportation bench mark, as referenced in the bridge plans.

Line Settings

You can choose the line style of the structure, such as the color and style that the lines will be in the graph by selecting the **Color** or **Style** drop-down menu in the **Line Settings** panel.

Details

Station:

This field captures the stations along the structure. Each station should be located at some changed condition (i.e., deck elevation change, substructure support location, or superstructure thickness change). The maximum value which can be entered into this field is 9999 + 99.999.

Ref Curb/Rail:

This field captures the elevation for the top of the reference point whether it is the curb, rail, or some other feature. A negative sign may be entered, if necessary. Note that the reference point is not plotted, but used to subtract sounding depths to obtain actual channel cross section elevations.

Deck:

This field captures the elevation for the top of deck of the structure. A negative sign may be entered, if necessary.

Bot FTG:

This field captures the elevation for the bottom of a spread, rock, or pile footing, if present. If there are two footings in a bent, such as for a two-column bent, the shallowest footing elevation should be entered. This field is seven digits long including three decimal places. A negative sign may be entered, if necessary. If the elevation of the bottom is unknown, leave it blank.

Crit Pier Scour Depth:

This field captures the elevation at which this foundation element could become unstable due to scour. If the elevation is unknown, leave it blank.

Pile Tip:

This field captures the pile tip elevation of the shallowest pile in a bent or under a pile footing, when present, and is seven digits long including three decimal places. A negative sign may be entered, if necessary. If the elevation is unknown, leave it blank.

FTG:

This field captures the type of foundation at each station entered. The data is used to graphically represent that particular type of foundation on the graph. The field contains the parameters below:

Code:	Description:
Drilled Shaft	Drilled shaft. If this is coded but a pile tip elevation is not, it is assumed that the elevation is unknown and the structure plot reflects this. If this elevation is known, it should be entered in the Pile Tip field.
No Footing	No footing at this station, however, some other change occurs

such as a change in the deck elevation or the superstructure thickness. No elevation should be entered for the bottom of footing or pile tip categories.

Pile Bent Pile bents not related to a spread footing. If this is coded but a pile tip elevation is not, it is assumed that the elevation is unknown and the structure plot reflects this. If this elevation is known, it should be entered in the Pile Tip field.

Pile Footing Spread footing on piles. If this code is entered but a bottom of footing elevation or pile tip elevation is not, it is assumed that these elevations are unknown and the plot of the structure reflects this. If elevations are known, they should be entered in the Bot FTG and Pile Tip fields.

Spread Footing Spread footing with no piles. If this code is entered but a Bottom of footing elevation is not, it is assumed that the elevation is unknown and the structure plot reflects this. If this elevation is known, it should be entered in the Bot FTG field.

Spread footing on Rock Spread footing on rock. If this code is entered but a footing elevation is not, it is assumed that the elevation is unknown and the structure plot reflects this. If this elevation is known, it should be entered in the Bot FTG field.

Tower Bent Tower bent. If this code is entered but a pile tip elevation is not, it is assumed that the elevation is unknown and the structure plot reflects this. If this elevation is known, it should be entered in the Pile Tip field.

Super Thick:

This field captures the thickness of the deck and superstructure to provide information for plotting the bottom of the girders.

Remarks:

This narrative field captures any pertinent remarks about the structure at the particular station.

To Add Structure Detail Information

If your structure has never had detail information entered, click **Create** next to "Orientation" in the **View** panel to create an Orientation. See Figure 3.

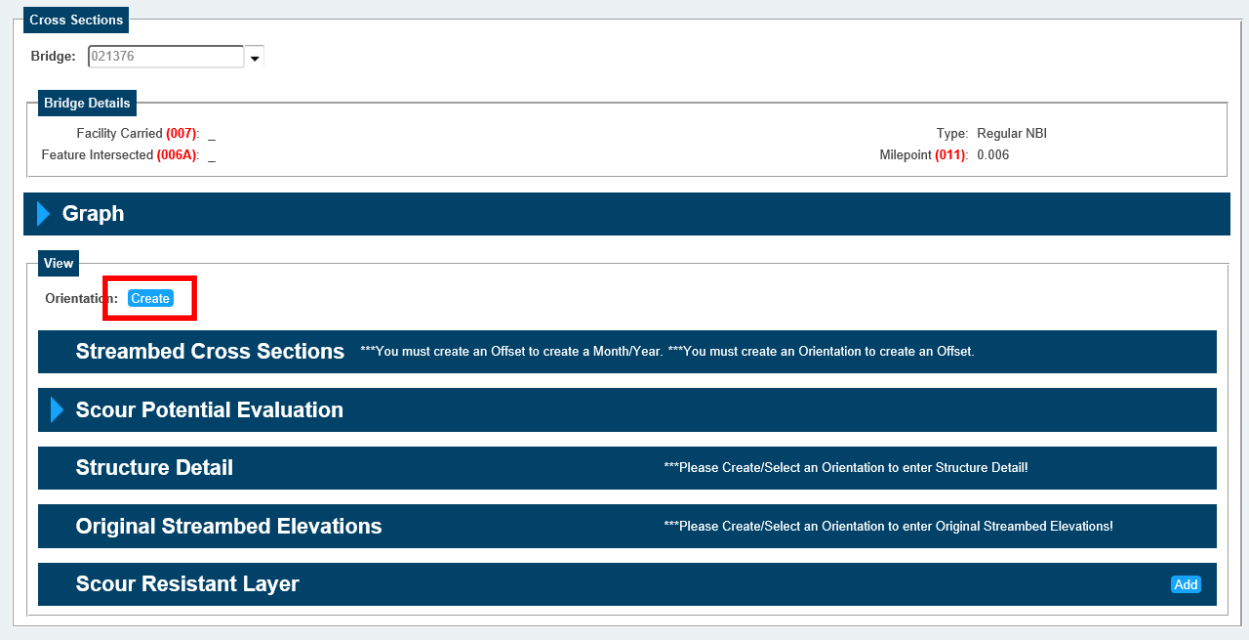


Figure 3

Next, select the New Orientation view. There are only two valid views – left and right that can be specified for each structure in the drop-down menu located in the top left of the **View** panel. After selecting the orientation, click **Add** to the right of the orientation field. See Figure 4.

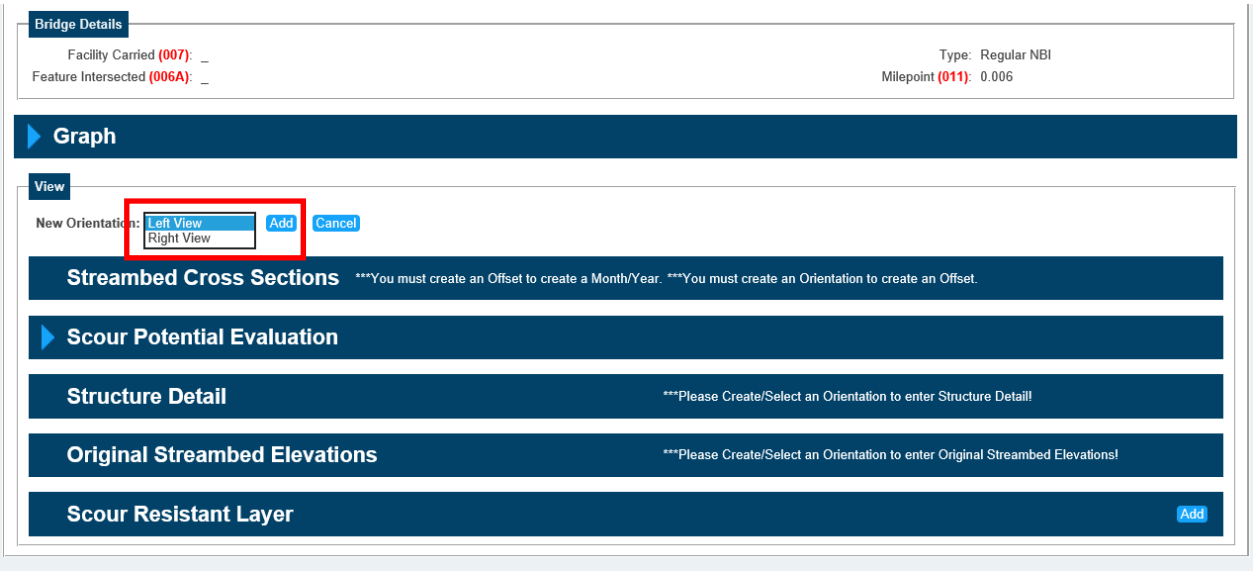


Figure 4

Click **Add** in the Structure Detail Pane to start entering the structure information. See Figure 5.

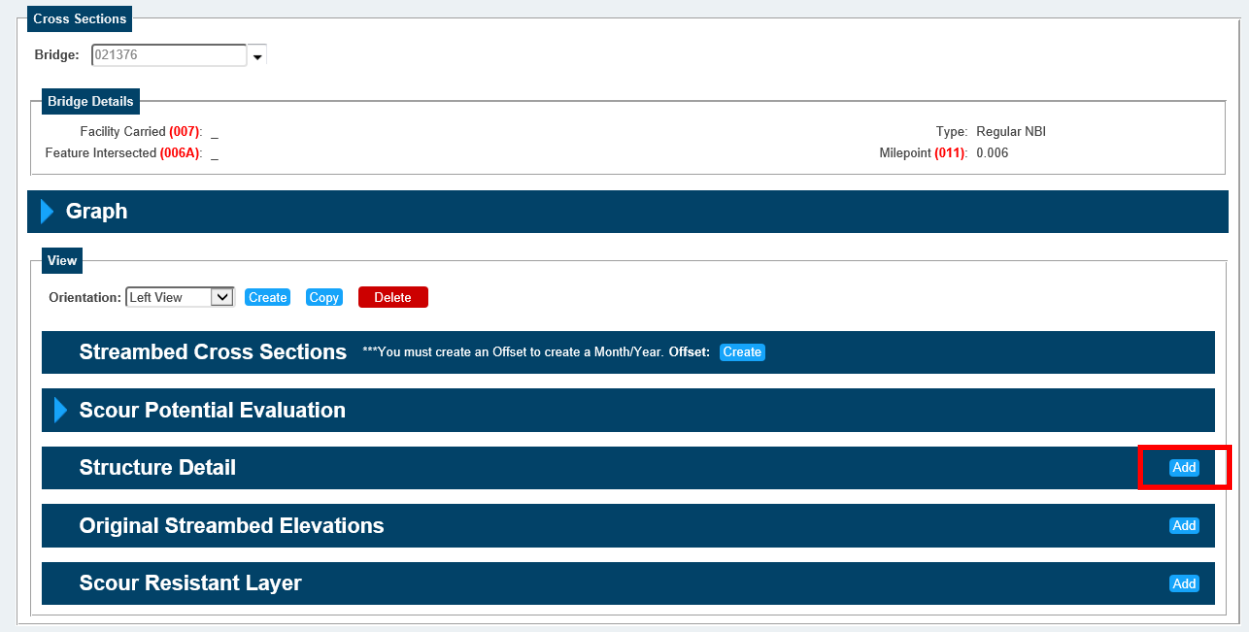


Figure 5

Once you click **Add**, the **Structure Detail** pane will then open. Fill out all required information in the **General Info** panel (this is highlighted in red in Figure 6).

You can choose the style and the color for the lines of the structure that will be in the graph by selecting the Color or Style drop-down menu in the **Line Settings** panel (this is highlighted in blue in Figure 6).

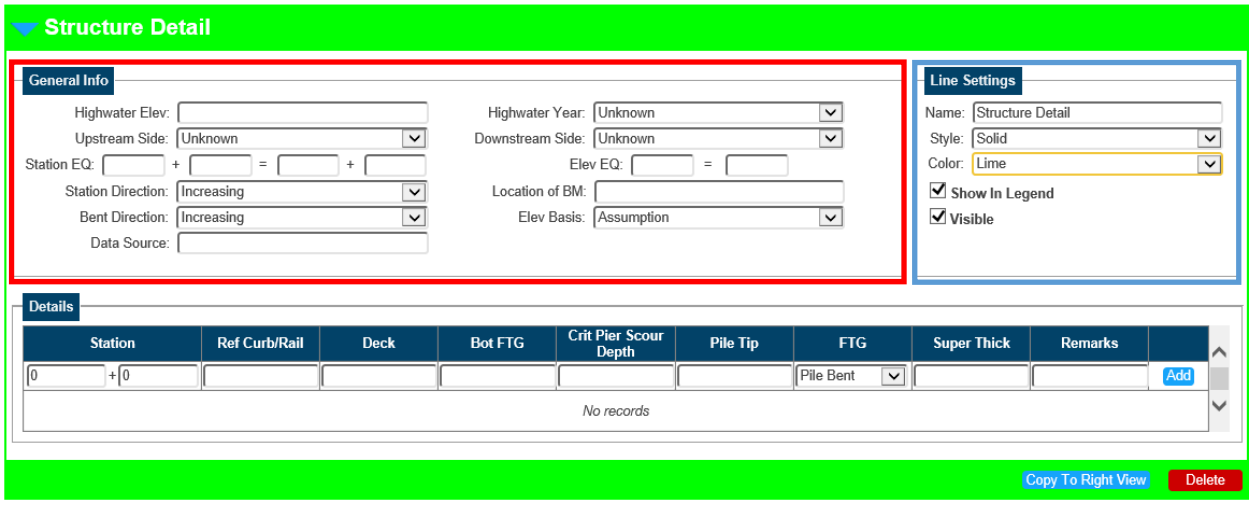


Figure 6

Next, fill all pertinent information in **Details** panel using the boxes below (highlighted in red in Figure 7), making sure to choose a footing type from the drop-down menu. You MUST click **Add** on the right of the **Detail** panel to submit that information and to be able to enter the next set of data. See the red arrow below in Figure 7. Repeat this step, adding as many lines as necessary, to finish the view.

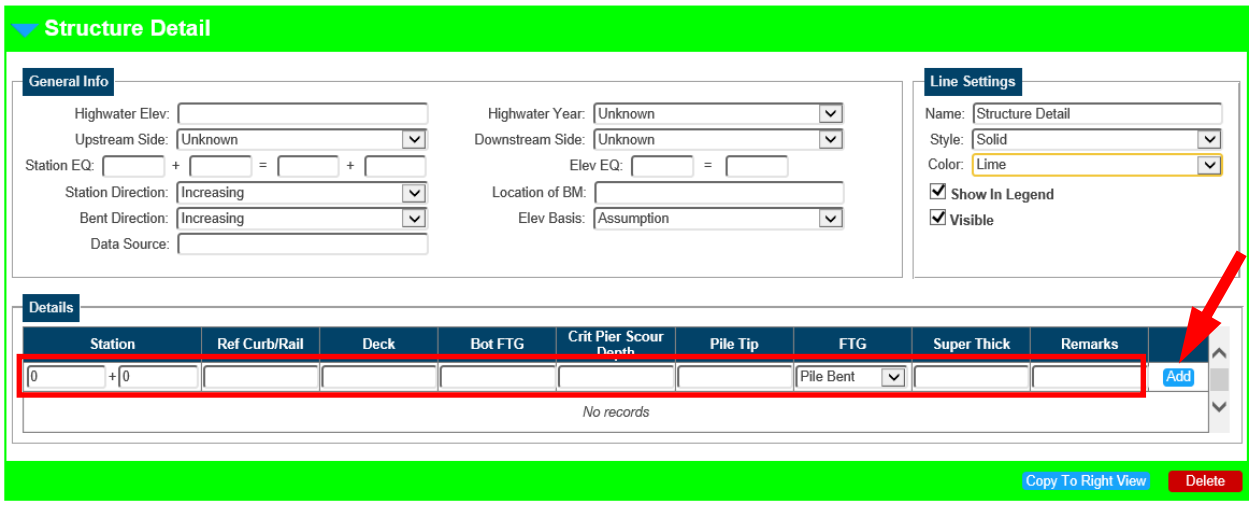


Figure 7

Note- Clicking **Delete** deletes the entire view. You will not be able to undo this.

After all records have been added, click **Save** (see arrow below in Figure 8)**.** The structure details will appear as shown in Figure 8. Note that the stations appear in order after saving. If the structure detail is similar on both sides of the structure, you may click "**Copy to Right** (or Left) **View**" (highlighted in red in Figure 8). This will automatically change the Orientation View to the opposite side of the structure with information already populated. Make any necessary edits and click **Save** again to save the new view.

Once the Structure Detail has been completed, that pane can be closed, if desired, by clicking the light blue arrow ▼ to the left of the words Structure Detail. See Figure 8.

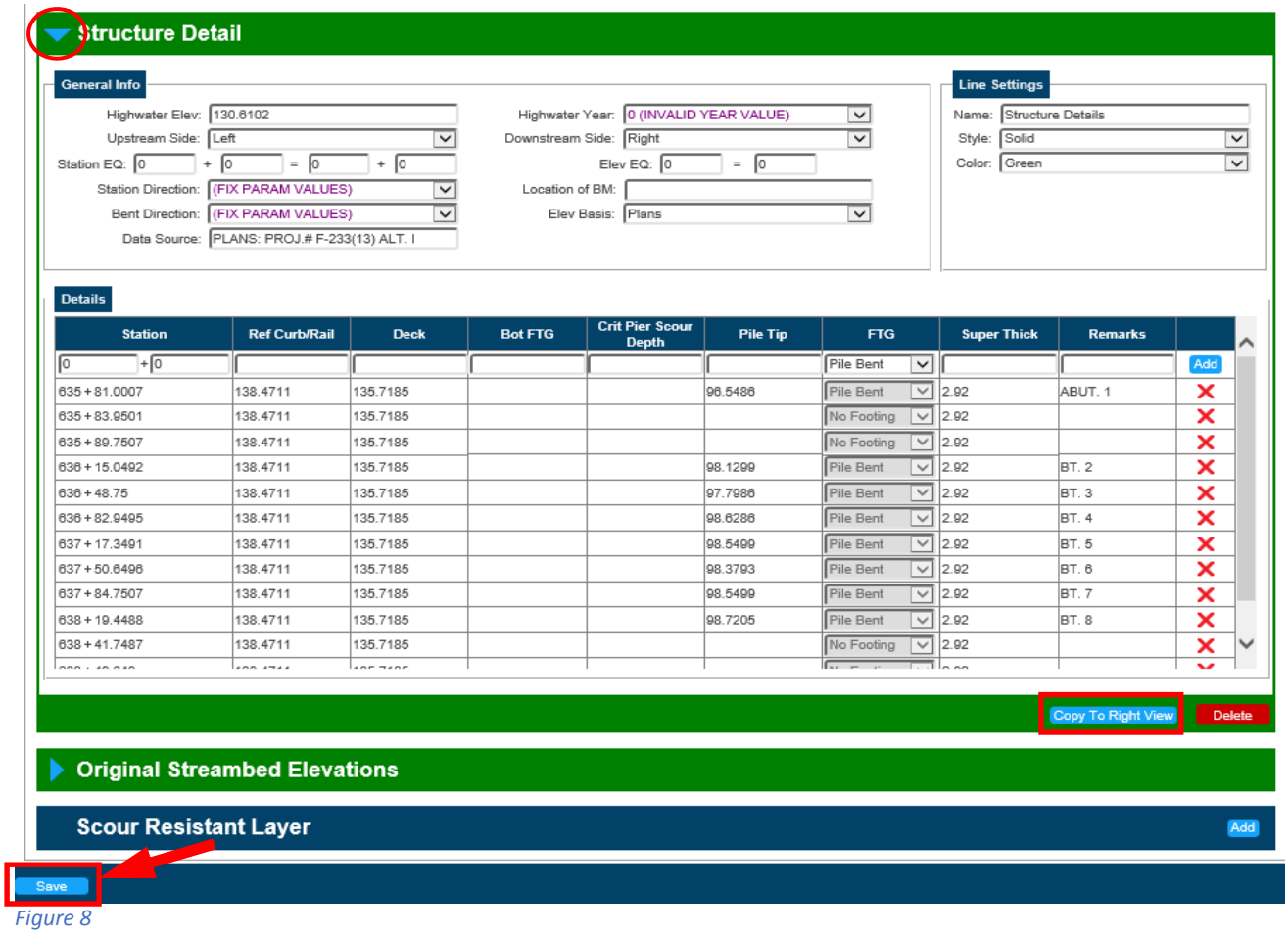


Figure 8

The structure that was just created by entering the Structure Detail information can be seen by clicking the light blue arrow ▸ next to the word **Graph** (see the red highlight circle in Figure 9). To view the entire graph once the **Graph** pane is open, click the "Parameters" tab to close the **Graphs Parameters** box (see the yellow highlight box in Figure 9).

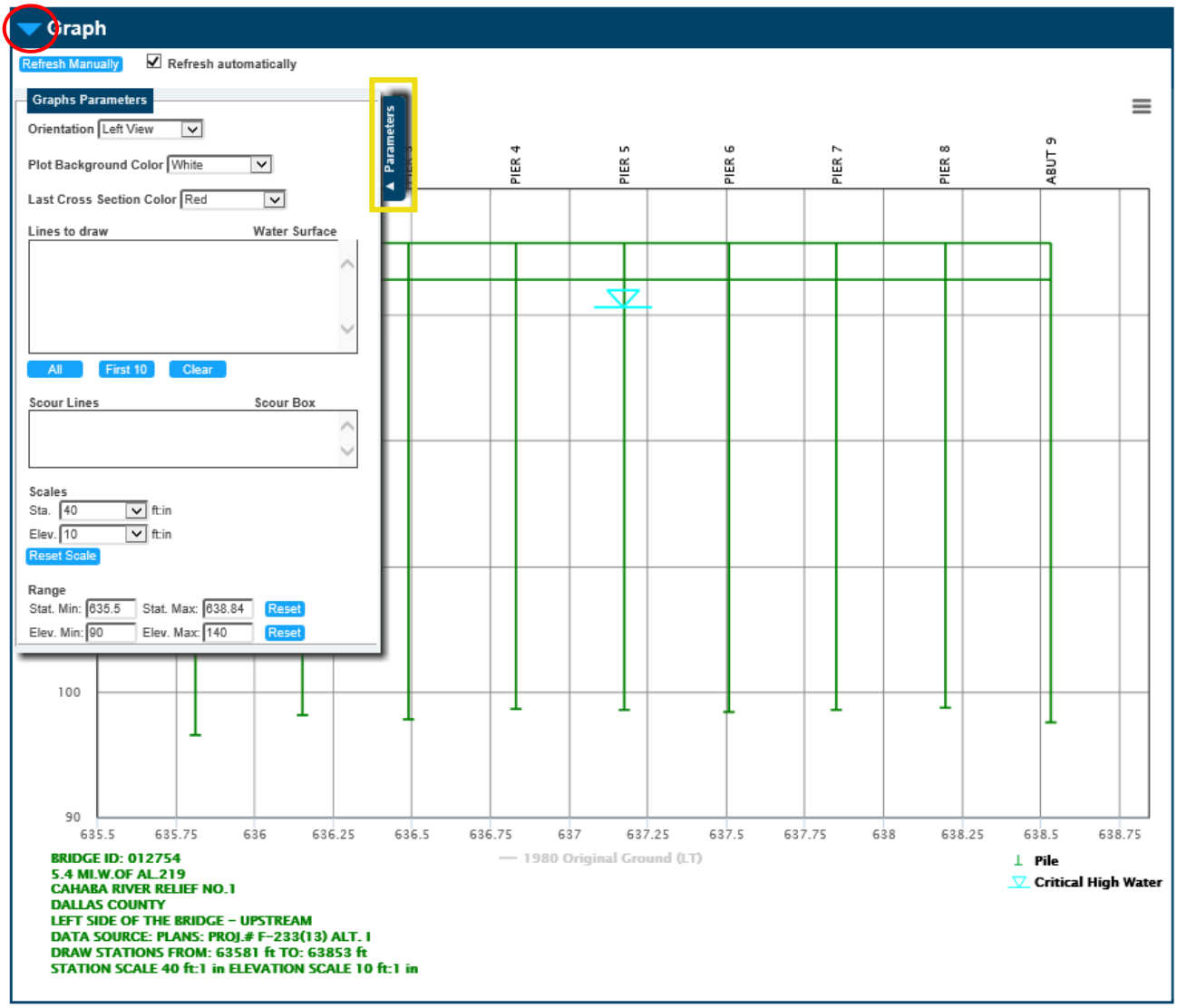


Figure 9

Figure 10 shows the new Structure Detail Graph. More information will be given in detail on how to navigate the new Graph function later in the manual.

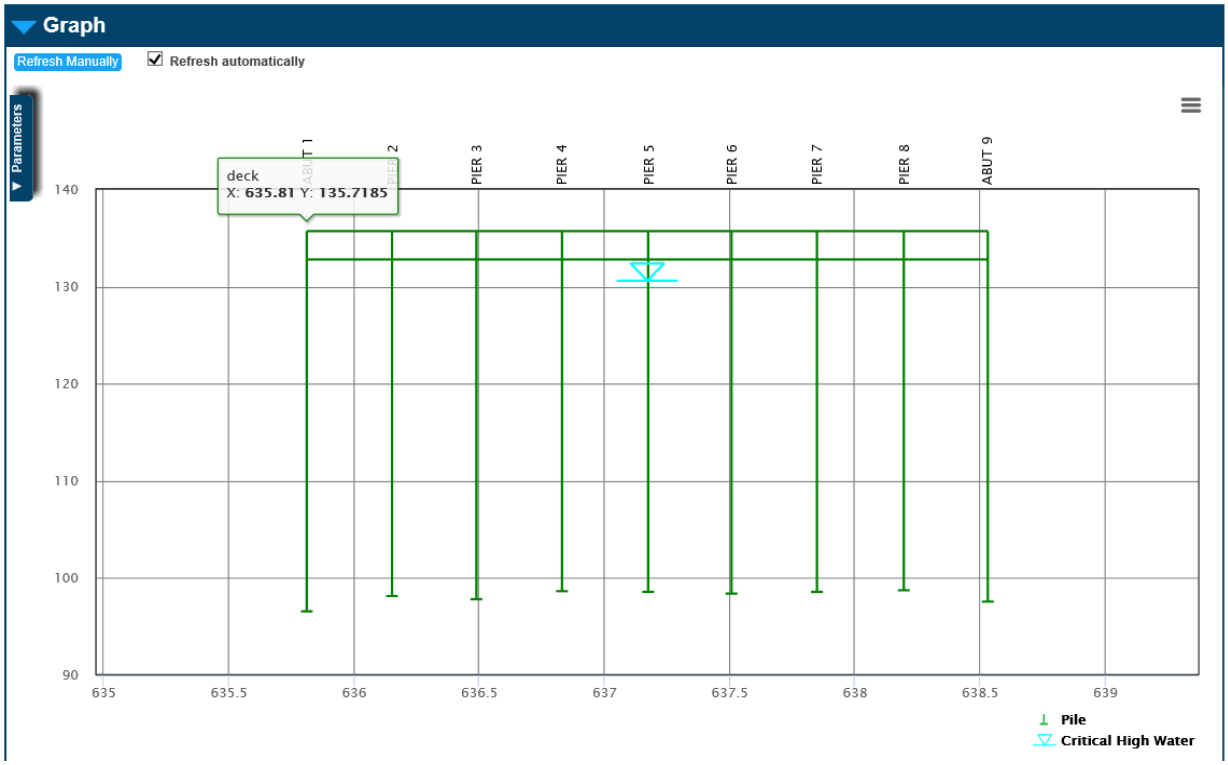


Figure 10

4.3 – Original Streambed Elevations

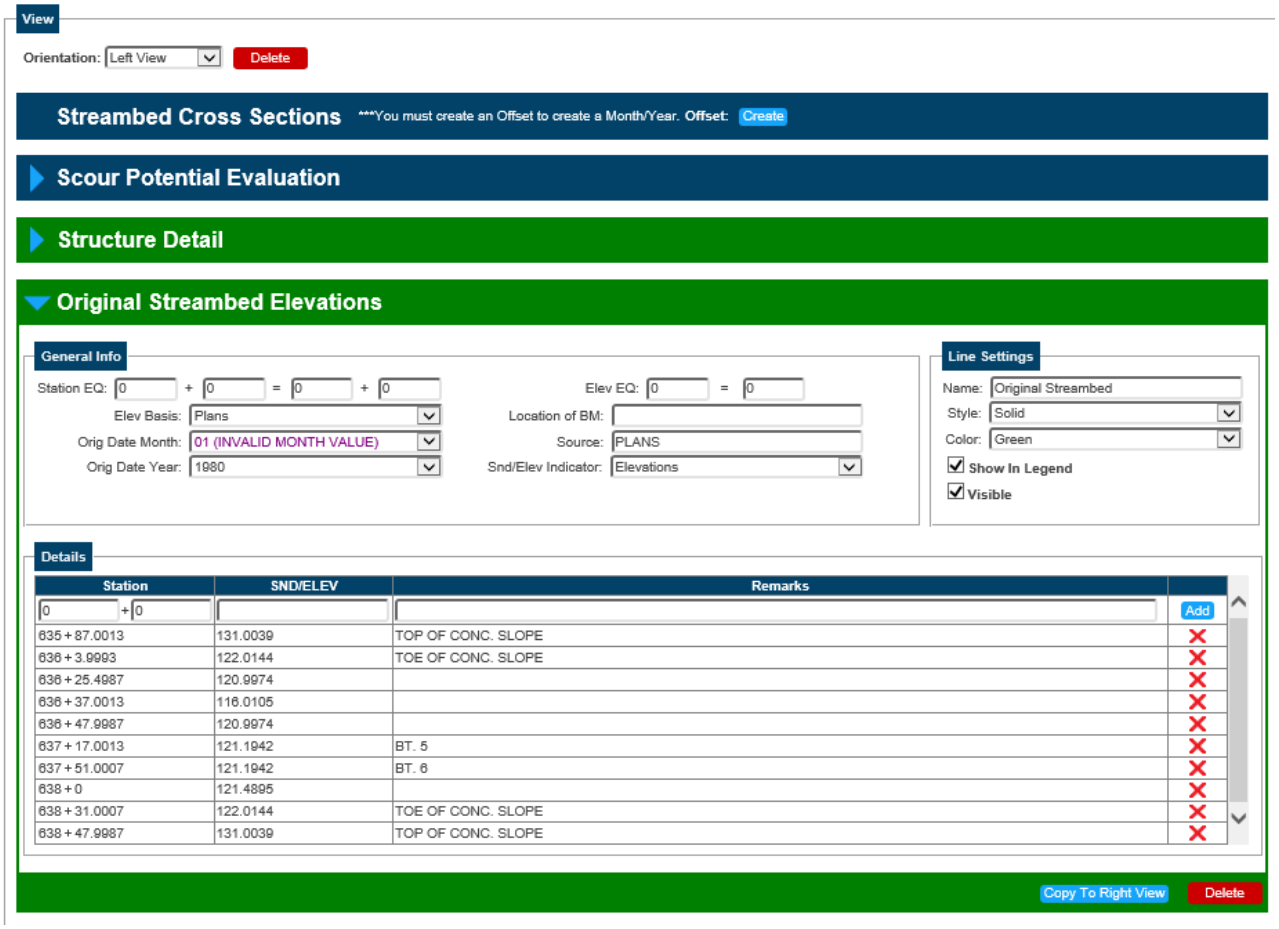


Figure 11

The Original Streambed Elevations pane (shown in Figure 11) allows you to enter the original streambed elevations so that a profile of the original streambed can be included on the scour plot. You may view, add, change, or delete the original streambed data from this screen. Again, there are only two valid views – left and right that can be specified for each structure in the drop-down menu located in the top left of the **View** panel. For each view of the structure, the station equation, elevation basis, original streambed month and year, elevation equation, location of benchmark, and source of elevations can be entered as needed. There is also a sounding/elevation indicator that must be entered. This application allows you to enter either sounding measurements or true elevations. The sounding/elevation indicator field is used by the program to identify which type of measurements have been entered. If sounding data is entered, the sounding depth is subtracted from the corresponding curb/rail reference elevation contained in the structure detail information to obtain the true streambed elevation. For each station along the streambed, the station, sounding/elevation and any pertinent remarks should be entered.

This information can be edited by simply clicking in the field that needs to be edited, or a line of information can be deleted using the ✕ icon on that row. You can delete entire views by clicking **Delete** in the bottom right corner of the screen (highlighted in red in Figure 12).

Note- Clicking **Delete** deletes the entire view. You will not be able to undo this.

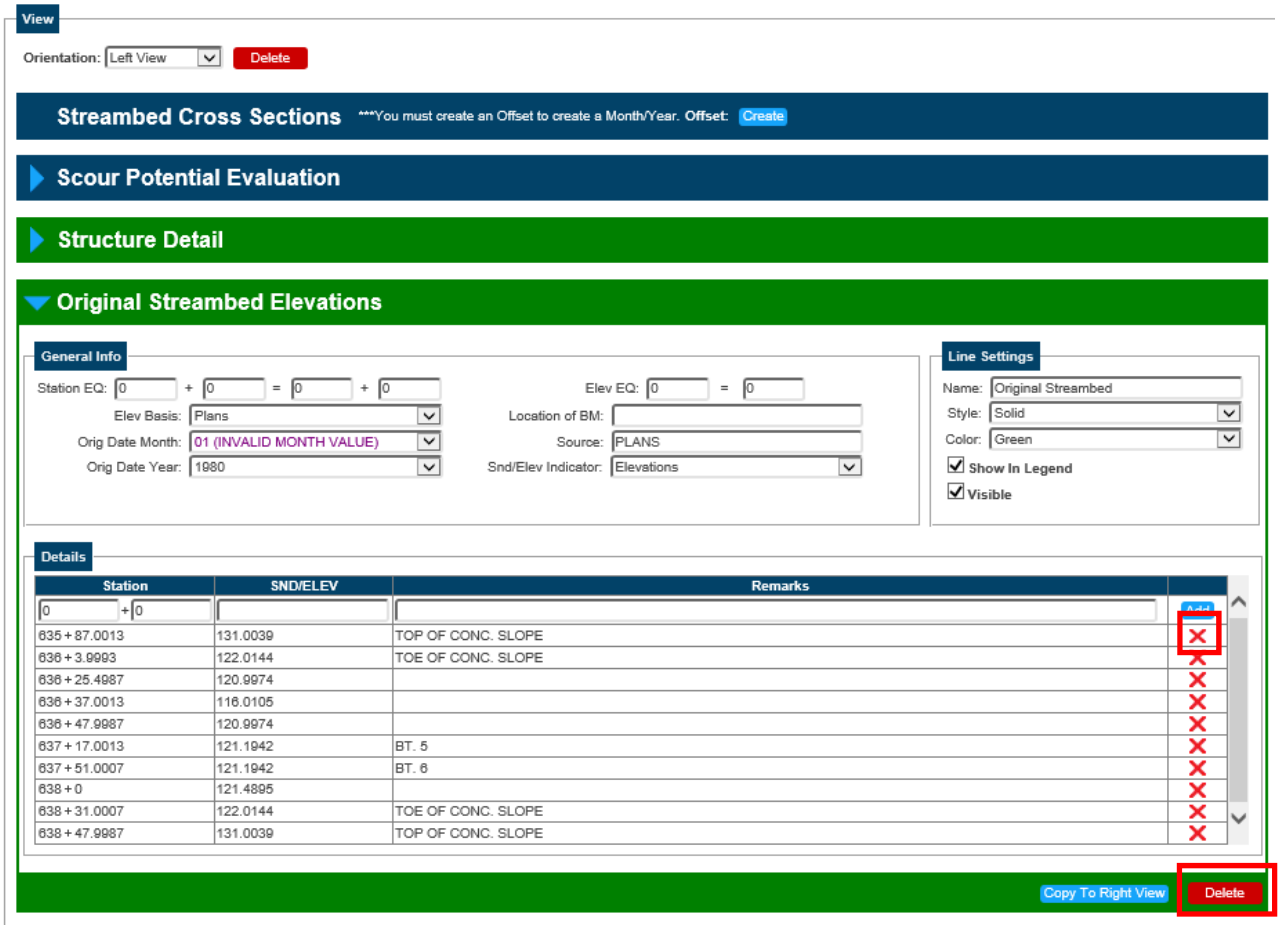


Figure 12

The following is a list of the valid fields on the screen. A brief explanation of each is included.

View Selection

View:

This field is used to identify the view of the original streambed elevations. The view of the bridge would be determined when traveling in the direction of the inventory route (increasing mile markers). The field contains the parameters below:

Left view - data is for the left side of the bridge
Right view - data is for the right side of the bridge

General Info

Station EQ:

This field is used to capture a station equation which may be required to reference all horizontal information from a common reference point. If the beginning of the bridge was assumed to be at station 1 + 00.00 and plans were later discovered showing 5 + 42.68, then a station equation could be used to correct the assumed station so historical reference material (i.e., plans and pile driving records) could be referenced appropriately to the bridge plot. Be aware that the station equation may be required for each section of data such as structure details, original streambed elevations, and streambed cross sections, so that they are all correlated by a common reference point. The station equations should be completed as required for the bridge to plot correctly (i.e., original streambed stations must be within the same station range as those of the structure detail).

Elevation Basis:

This field captures the type of platform the elevations for the original streambed are based on. The field contains the parameters below:

Code:	Description:
Assumption	Elevations are based on assumption. From some semi-permanent, fixed point, on or near the bridge, an elevation is assumed. All subsequent elevations for the structure are based on this "assumed" elevation.
US Geodetic Survey	Elevations are based on a U.S. Geodetic Survey bench mark or an Alabama Department of Transportation bench mark. This would be basically the same as elevations from the bridge plans except that plans might not be available on the structure, but a geodetic marker is conveniently close.
Plans	Elevations are taken from the bridge plans. In this case, the elevations are usually based on a permanent U.S. Geodetic Survey bench mark or an Alabama Department of Transportation bench mark, as referenced in the bridge plans.

Orig Date Month:

This field captures the month of the original streambed elevation.

Orig Date Year:

This field captures the year of the original streambed elevation.

Elev EQ:

This field captures the elevation equation which may be used to reference all vertical information from a common reference plane for plotting. If the bridge details are initially plotted based on an assumed reference elevation and later plans are located which show the actual elevations, the initial assumed reference elevation can be equated to the actual elevation based on the information from the plans.

For example, a crew goes to the field to gather bridge detail information and they set a reference point with assumed elevations, such as 150.00 feet. Later, a different crew goes to gather streambed sounding information and they use the same reference point but assume an elevation of 100.00 feet. These plots can and must be put on a common reference line by keying an elevation equation. In this case, the elevation equation on the streambed soundings form would be 100.00 feet equals 150.00 feet because the streambed soundings should be linked to the same elevation.

Be aware that an elevation equation may be required for each section of data such as structure details, original streambed elevations, and streambed cross sections, so that they are all correlated by a common reference point. The elevation equations should be completed as required for the bridge information to plot correctly (i.e., original streambed stations must be within the same elevation range as those of the structure detail).

Location of Benchmark (BM):

This field captures the location of the bench mark used for referencing the original streambed (i.e., top of rail, from curb, from deck).

Source:

This field captures the source of the original streambed elevations. This information may come from plans or the first streambed soundings taken at a structure.

Sounding/Elevation Indicator (SND/ELEV Indicator):

This field is used to indicate whether the recordings are actual elevations or soundings. This indicator is used by the program to determine the type of data that is being entered. The field contains the parameters below:

Code:	Description:
Elevations	Elevation data give actual elevations of the points. This requires the inspector to calculate the elevation based on measurements. For example, if the measurements are taken with a rod and level, then the elevation of each reading would be calculated by subtracting the rod reading from the elevation of the level (height of the instrument).
Soundings	Sounding data should be used if the data recorded are measurements taken from the bridge deck railing or some other reference feature using a weighted tape with no calculations made. This measurement is automatically subtracted from the curb/rail reference elevations recorded in the structure detail pane. For more information on the structure detail portion, refer to the Structure Scour/Hydrology Module Users Guide.

Line Settings

You can choose the line settings of the original streambed elevation line, such as the color and style that the lines will be in the graph by selecting the **Color** or **Style** drop-down menu in the **Line Settings** panel. You can also choose not to show this line in the **Graph** legend by clicking the check box to the left of "Show In Legend". Additionally, you can choose the same option by clicking the check box to the left of where is says "Visible". These last two options are below the line style and color options.

Details

Station:

This field captures the particular station at which a streambed elevation change occurs. The maximum value which can be entered into this field is 9999 + 99.999. Negative stations can be entered if needed.

Sounding/Elevation:

This field captures the sounding measurement or elevation for each station. Negative soundings may be entered, if needed. A value is required for this field if a station has been entered.

Remarks:

This narrative field captures any pertinent remarks that are related to that station.

To Enter a New Original Streambed Elevation

If your structure has never had original streambed information entered, select the appropriate orientation (Left or Right View) and click **Add** in the **Original Streambed Elevations** panel on the main screen of the Cross Sections Task (see Figure 13).

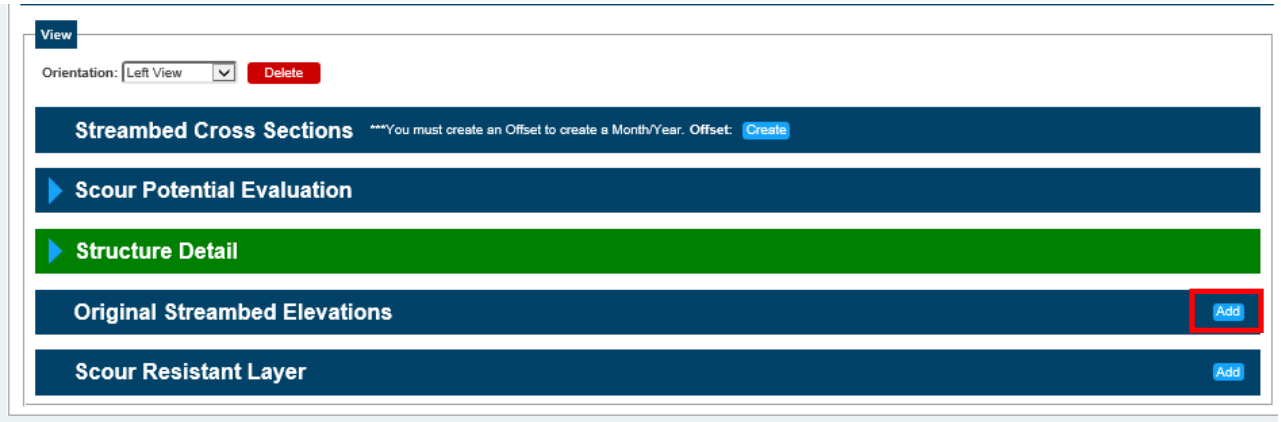


Figure 13

Next, fill in the required information in the **General Info** panel (see red highlight box in Figure 14) and select the desired settings in the **Line Settings** panel (see blue highlight box in Figure 14).

Once the general information has been completed, fill in the Station, Sounding/Elevation, and any pertinent remarks for your first line of data in the **Details** panel below. You MUST click **Add** to the right of the **Details** panel to submit that information and to be able to enter the next line of data. See the red arrow below in Figure 14. Repeat this step, adding as many lines as necessary, to finish your view.

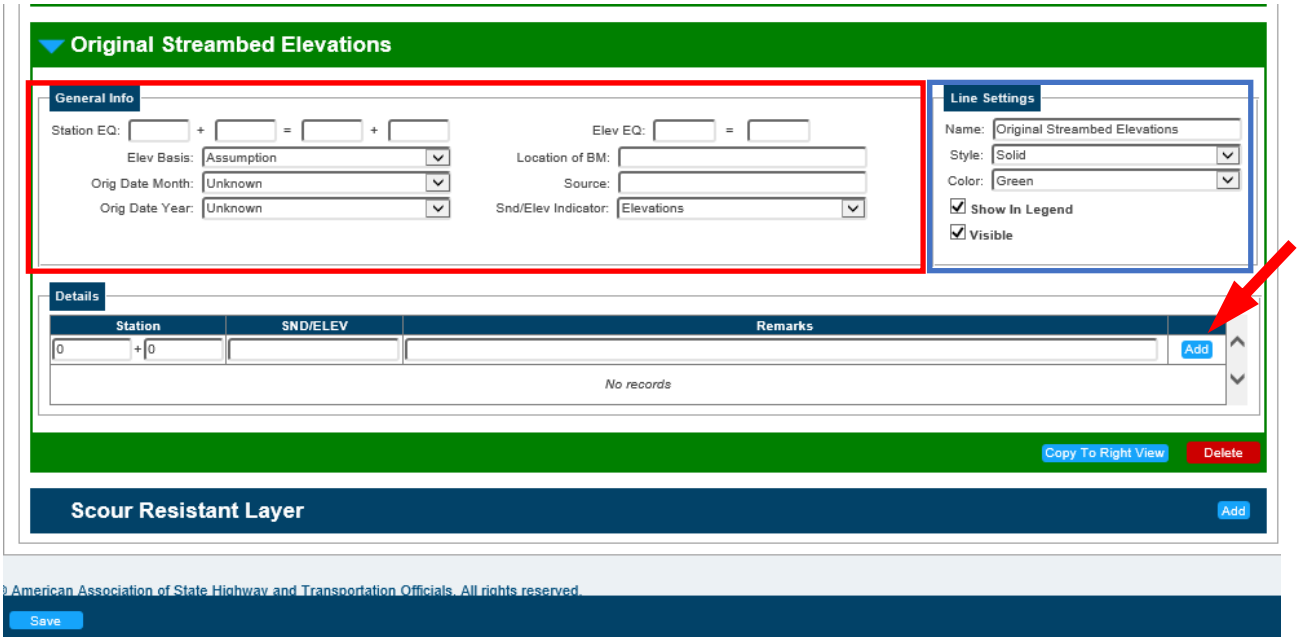


Figure 14

After all records have been added, click **Save**. Your completed view appears as shown in Figure 15. Note that the stations will appear in increasing order after saving.

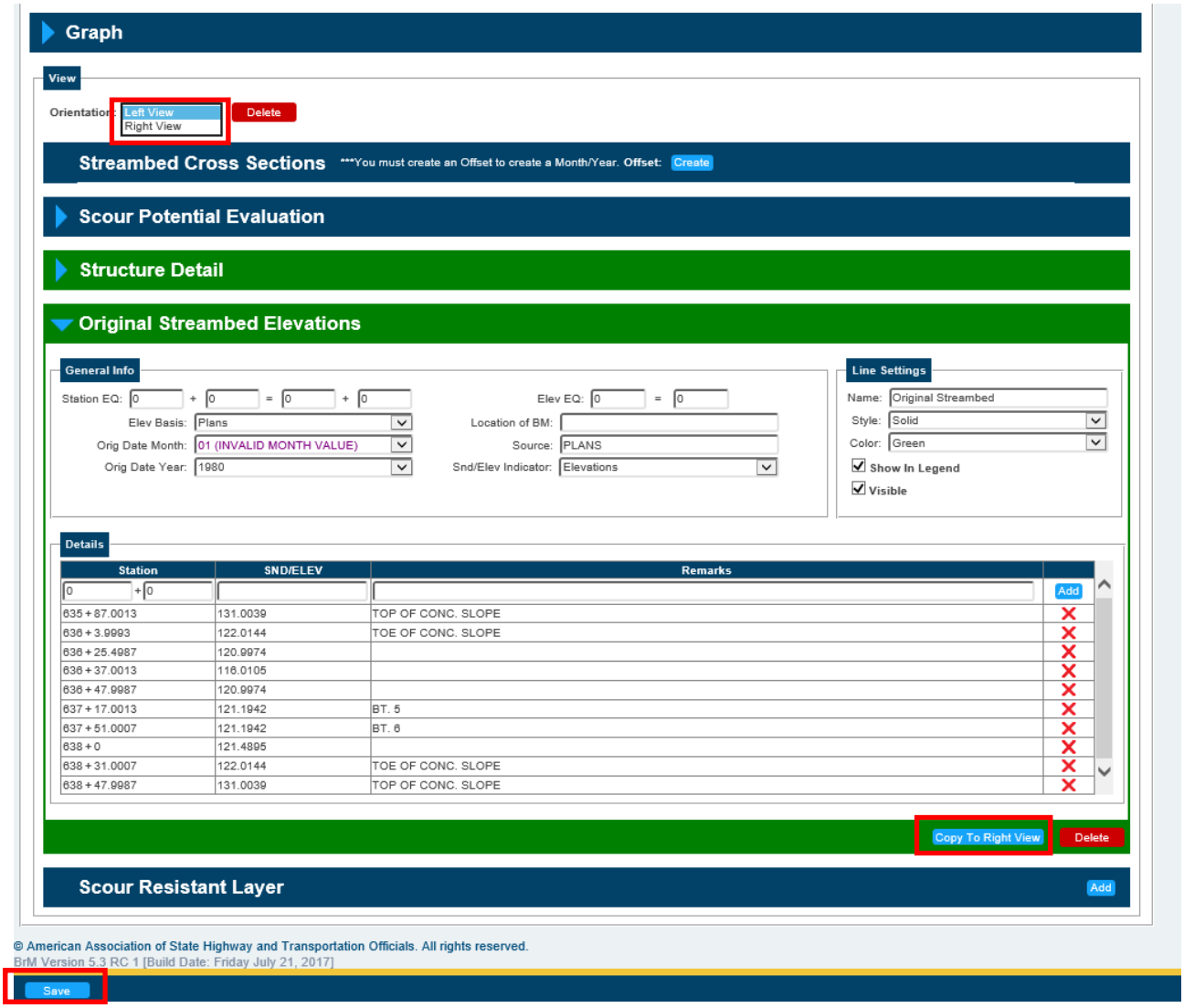


Figure 15

Additional views can be created either by clicking "**Copy to Right** *(or Left)* **View"** or selecting the other side from the **Orientation:** drop-down menu and manually adding new Original Streambed Elevation information (See Figure 15).

4.4 : Streambed Cross Sections

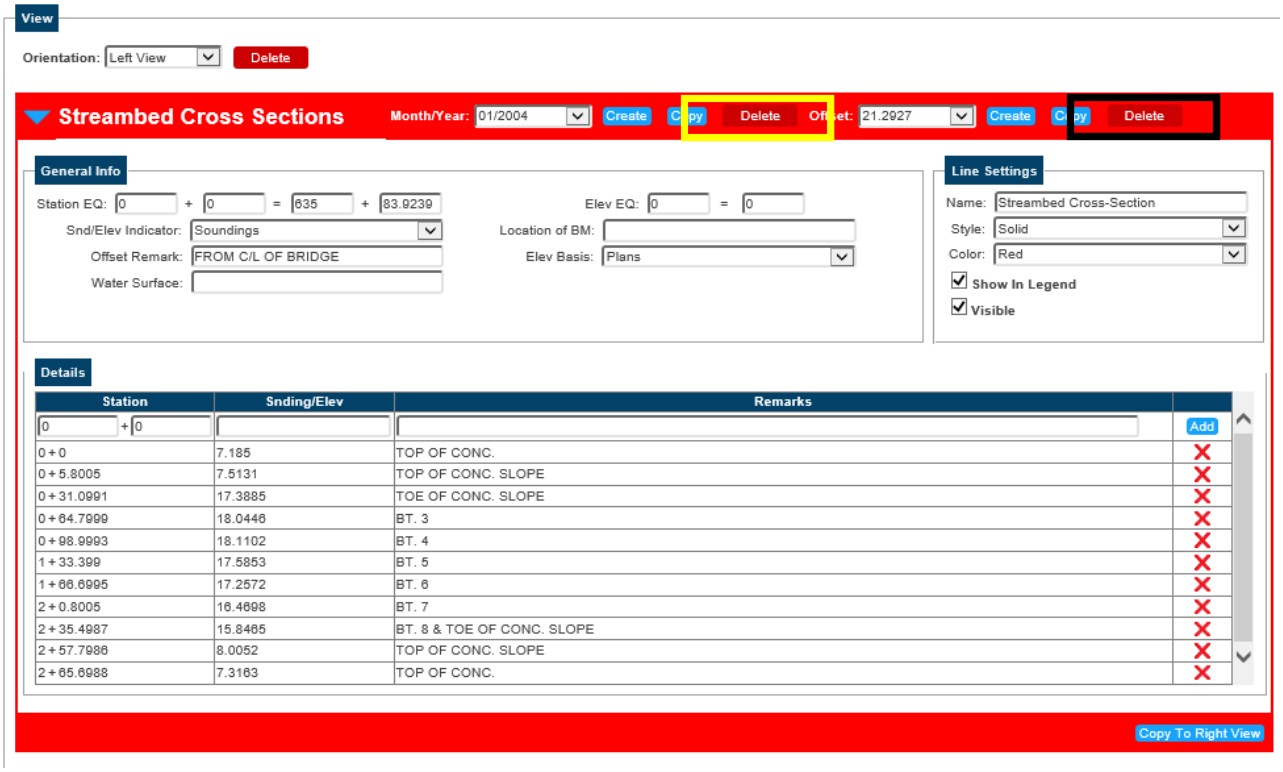


Figure 16

The Streambed Cross Section pane (shown in Figure 16) allows you to enter the Streambed Sounding data from the BI-4 form, so stream profiles can be included on the graph. You may view, add, change, or delete sounding data from this screen. In many cases, the same stations would be used each time a streambed sounding is taken. A routine to copy the data is included to reduce the need for keying this redundant data. Soundings are identified by the offset, sounding date and view. Therefore, a structure may have several sets of soundings depending on the number of offsets, dates, and views for the structure.

There are two valid views that can be specified for the structure – left or right. An unlimited number of soundings can be entered for each view based on the different offsets and sounding dates. For each possible combination, the station equation, offset remark, elevation equation, location of benchmark, and elevation basis can be entered. There is also a sounding/elevation indicator that must be entered. This application allows you to enter either sounding measurements or true elevations.

The sounding/elevation indicator field is used by the program to identify which type of data has been entered. If sounding data is entered, the sounding depth is subtracted from the corresponding curb/rail reference elevation contained in the structure detail information to obtain the true streambed elevation. For each sounding/elevation location along the structure, the station, the sounding or elevation, and any remarks pertinent to that station should then be entered. This information can be edited by simply clicking in the field that needs to be edited, or a line of information can be deleted using the ✕ icon on that row. You can delete entire views by clicking **Delete** in the top of the screen (highlighted in yellow in Figure 16).

Note - Clicking **Delete** (highlighted in the black box) automatically deletes all entries with that offset. There is no way of undoing this. **DO NOT USE the Delete in the Black Box!**

The following is a list of the valid fields on this screen. A brief explanation of each is included.

View Selection

View:

This field is used to identify the view in which the cross sections were taken. The view of the bridge would be determined when traveling in the direction of the inventory route (increasing mile markers). The field contains the parameters below:

Left view - data is for the left side of the bridge
Right view - data is for the right side of the bridge

Views are named by a combination of their **Orientation** and their **Offset** - for example, an agency might have two views: one at the left face of the structure and another a further 50 feet upstream. You must create at least one **Orientation** and one **Offset** to collect data. Most agencies choose to define the offset as the distance from the bridge centerline.

Offset:

This field is used to indicate the distance of the offset from where the streambed soundings were taken. The field is four characters long to record the offset distance to the nearest tenth of a meter or foot. For example, if the readings are taken from the left edge of the bridge deck, then this item should be recorded as one-half of the bridge deck width if the offset is from the centerline of the bridge.

Sounding Month/Year:

This field captures the month and the 4-digit year that the streambed soundings were taken.

General Info

Station EQ:

This field is used to capture a station equation which may be required to reference all horizontal information from a common reference point. If the beginning of the bridge was assumed to be at station 1 + 00.00 and plans were later discovered showing the beginning of the bridge at station 5 + 42.68, then a station equation could be used to correct the assumed station. This allows historical reference material (i.e. plans and pile driving records) to be referenced appropriately to the bridge plot. It is important to note that the station equation may be required for each section of data such as structure details, original streambed elevations, and streambed cross sections, so that they are all correlated by a common reference point. The station equations should be completed as required for the bridge to plot correctly.

Sounding/Elevation Indicator (SND/ELEV Indicator):

This field is used to indicate whether the recordings are actual elevations or soundings. This indicator is used by the program to determine the type of data that is being entered. The field contains the parameters below:

Code:	Description:
Elevations	Elevation data gives actual elevations of the points. This requires the inspector to calculate the elevation based on measurements. For example, if the measurements are taken with a rod and level, then the elevation of each reading would be calculated by subtracting the rod reading from the elevation of the level (height of the instrument).
Soundings	Soundings data should be used if the data recorded are measurements taken from the bridge deck railing or some other reference feature using a weighted tape with no calculations made. This measurement is automatically subtracted from the curb/rail reference elevations recorded in the bridge detail information of the scour module. For more information on the bridge detail portion of the scour module, refer to the *Structure Scour/Hydrology Module Users Guide*.

Offset Remark:

This is a narrative field used to describe the offset location. For example, a typical offset remark would relate an offset distance from the centerline of the bridge.

Water Surface:

This field captures the elevation of the water surface when the streambed cross sections were taken. If captured, this can be included as another layer on the graph.

Elev EQ:

This field captures the elevation equation which may be used to reference all vertical information from a common reference plane for plotting. If the bridge details are initially plotted based on an assumed reference elevation and later plans are located showing the actual elevations for the bridge, the initial assumed reference elevation can be equated to what the actual elevation is at that point based on the information from the plans.

If a crew goes to the field to gather bridge detail information and they set a reference point with assumed elevations, such as 150.00 feet, then a different crew gathers streambed sounding information and they use the same reference point but assume an elevation of 100.00 feet, these plots can and must be put on a common reference line by keying an elevation equation. In this case, the elevation equation on the streambed soundings form would be 100.00 feet equals 150.00 feet because the streambed soundings should be linked to the same elevation.

Be aware that an elevation equation may be required for each section of data such as structure details,

original streambed elevations, and streambed cross sections, so that they are all correlated by a common reference point. The elevation equations should be completed as required for the bridge information to plot correctly.

Location of Benchmark (BM)
This field captures the location of the bench mark used for referencing the cross sections (i.e., top of rail, from curb, from deck).

Elevation Basis
This field captures the type of platform the elevations for the soundings are based on. The field contains the parameters below:

Code:	Description:
Assumption	Elevations are based on assumption. From some semi-permanent, fixed point, on or near the bridge, an elevation is assumed. All subsequent elevations for the structure are based on this "assumed" elevation.
US Geodetic Survey	Elevations are based on a U.S. Geodetic Survey bench mark or an Alabama Department of Transportation bench mark. This would be basically the same as elevations from the bridge plans except that plans might not be available on the structure, but a geodetic marker is conveniently close.
Plans	Elevations are taken from the bridge plans. In this case, the elevations are usually based on a permanent U.S. Geodetic Survey bench mark or an Alabama Department of Transportation bench mark, as referenced in the bridge plans.

Line Settings

You can choose the line setting of the original streambed elevation line, such as the color and style that the lines will be in the graph by selecting the **Color** or **Style** drop-down menu in the **Line Settings** panel. You can also choose not to show this line in the **Graph** legend by clicking the check box to the left of “Show In Legend”. Additionally, you can choose the same option by clicking the check box to the left of where is says “Visible”. These last two options are below the line style and color options.

Details

Station:
This field captures the station at which the sounding or elevation was taken. The maximum value which can be entered into this field is 9999 + 99.999.

Sounding/Elevation:
This field captures the sounding measurement or elevation for each station. Negative values may be entered, if needed. A value is required for this field if a station has been entered.

Remarks:
This narrative field captures any pertinent remarks that are related to that station.

To Add a New Streambed Cross Section

If your structure has never had sounding data entered, the screen displays a message asking you to select a view and click **Create** to add an offset. An offset must be created before you can add the cross-section data (see Figure 17).

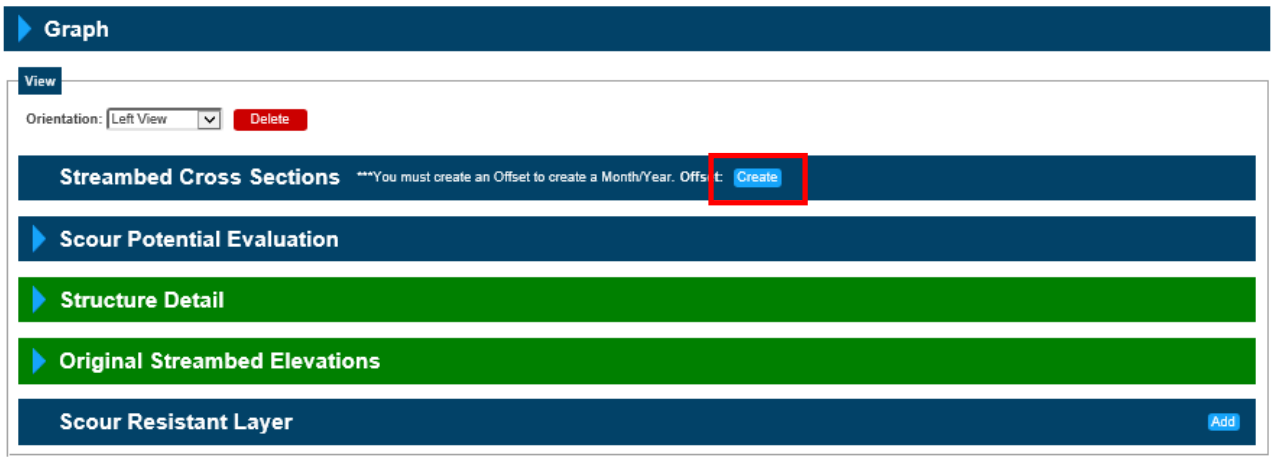


Figure 17

You will then be prompted to enter the proper offset for the streambed cross section. After doing so, click **Add** (see Figure 18).

Figure 18

Next, click **Create** to add a Month/Year (see Figure 19).

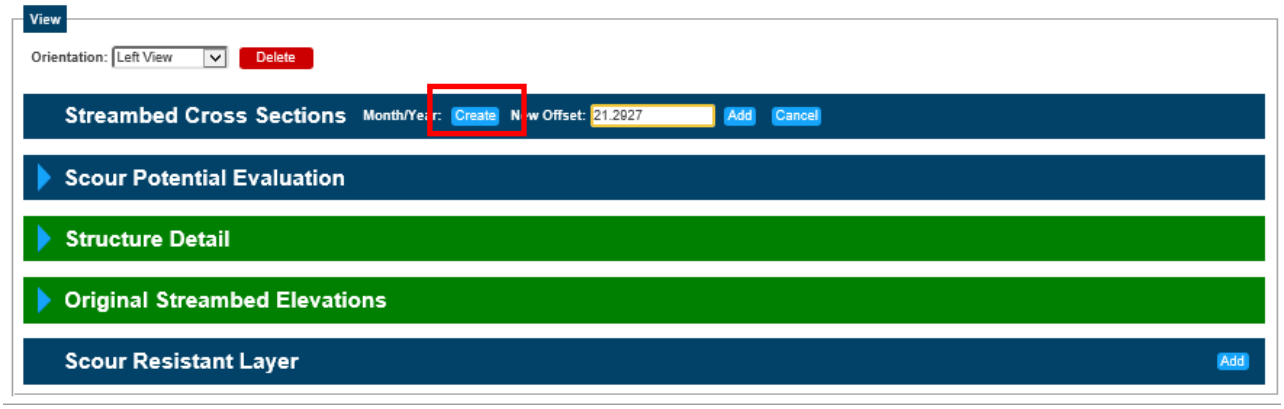


Figure 19

You will then need to select the date (Month & Year) that the soundings were taken.

Next, Click **Add** directly to the right of the date (see Figure 20) to create the new streambed cross section.

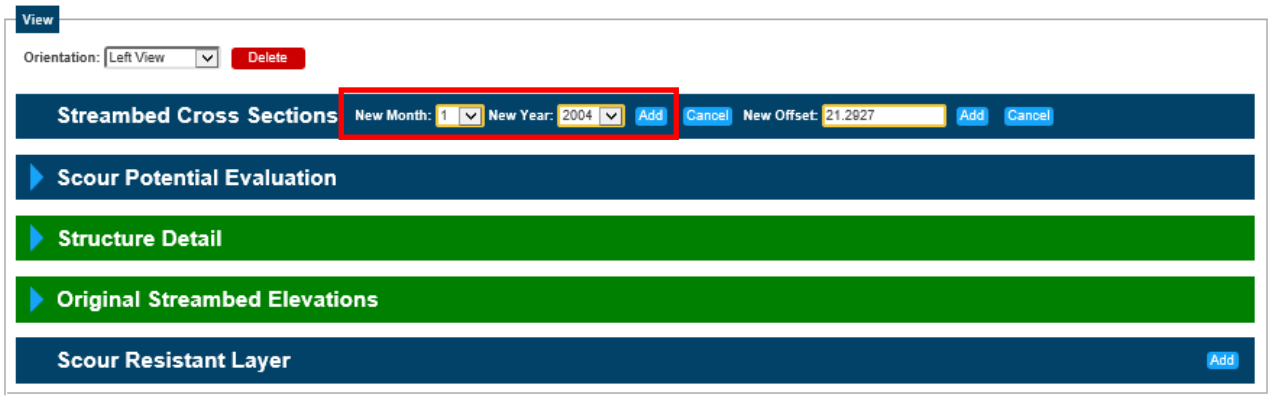


Figure 20

Next, fill in the required information in the **General Info** panel and select the desired settings in the **Line Settings** panel.

Once the general information has been completed, fill all pertinent information in the **Details** panel using the boxes below. You MUST click **Add** to the right of the **Detail** panel to submit that information and to be able to enter the next set of data. Repeat this step, adding as many lines as necessary, to finish the view (see Figure 21).

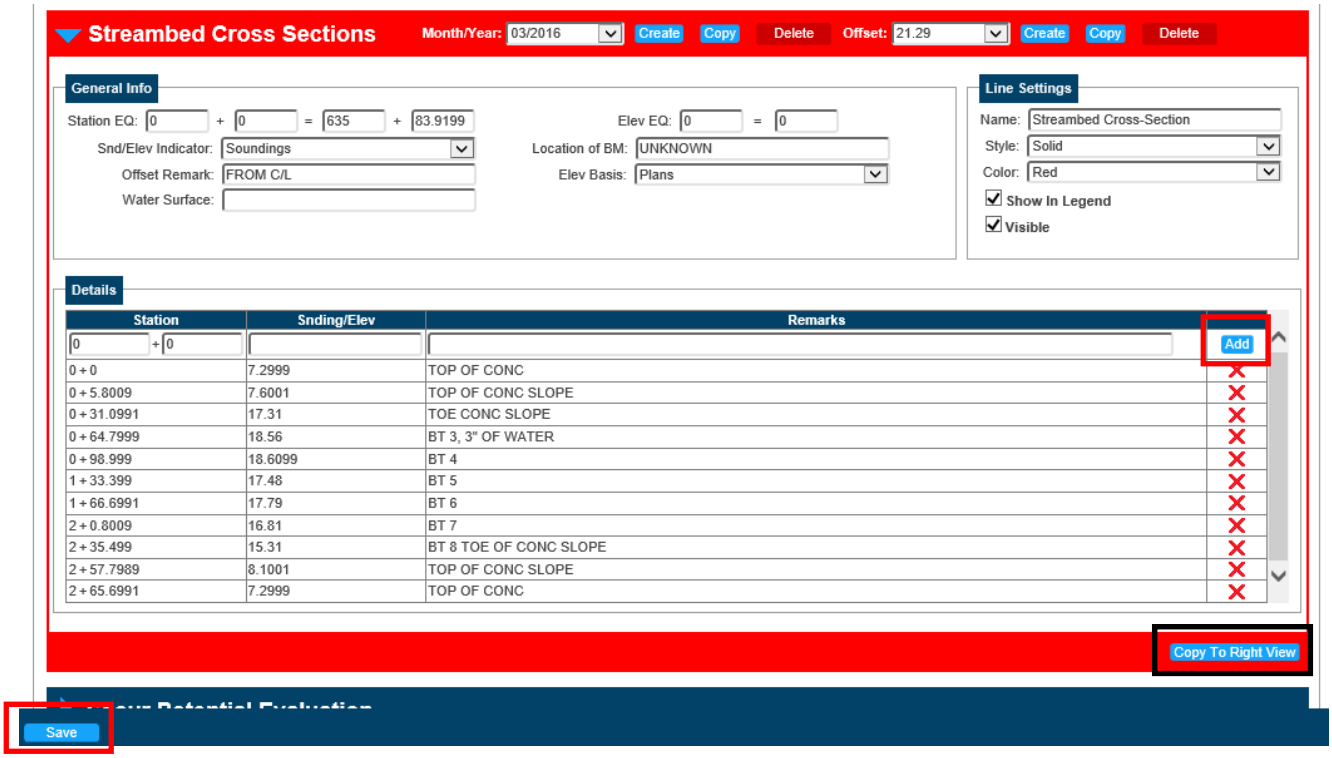


Figure 21

After all records have been added, click **Save.** Note that the streambed cross-sections will appear in increasing order by their stations after saving. Additional views can be created either by clicking "**Copy to Right** (or Left) **View"** (see the black highlight box in Figure 21) or selecting the other side from the **View:** drop-down menu and manually adding a new streambed cross section. if you select the **Copy to Right** (or Left) **View**, this will automatically change the Orientation View to the opposite side of the structure with information already populated. Click **Save**.

From here you can make any changes necessary to reflect your current soundings data. Ensure that you click **Save** after any necessary edits are made to save the new view. After all sounding data has been entered for a structure, you can print and view your scour plots using the Graph panel.

To Add an Additional Streambed Cross Section

If streambed cross sections already exist for a structure, the **Streambed Cross Sections** pane will look similar to Figure 22. You will see the sounding data for the displayed Month/Year. If you need to add an additional set of streambed cross sections, you can either copy an existing set of soundings and modify it, or create and enter a new set of data. If you create a new set of data, you will have to fill in all ***General Info***, ***Line Settings***, and ***Details***.

Copying Existing Cross Sections

In many cases, station points along a structure remain the same and are used to take measurements during each inspection. To enter a new set of streambed cross section data, you can choose to copy the most recent soundings and edit the data to create your new cross section.

First, select the view (Left or Right) that you would like to update. When a view is selected, the Month/Year should default to the most recent streambed cross section for that view. Click **Copy** to the right of the Month/Year field highlighted in black in Figure 22.

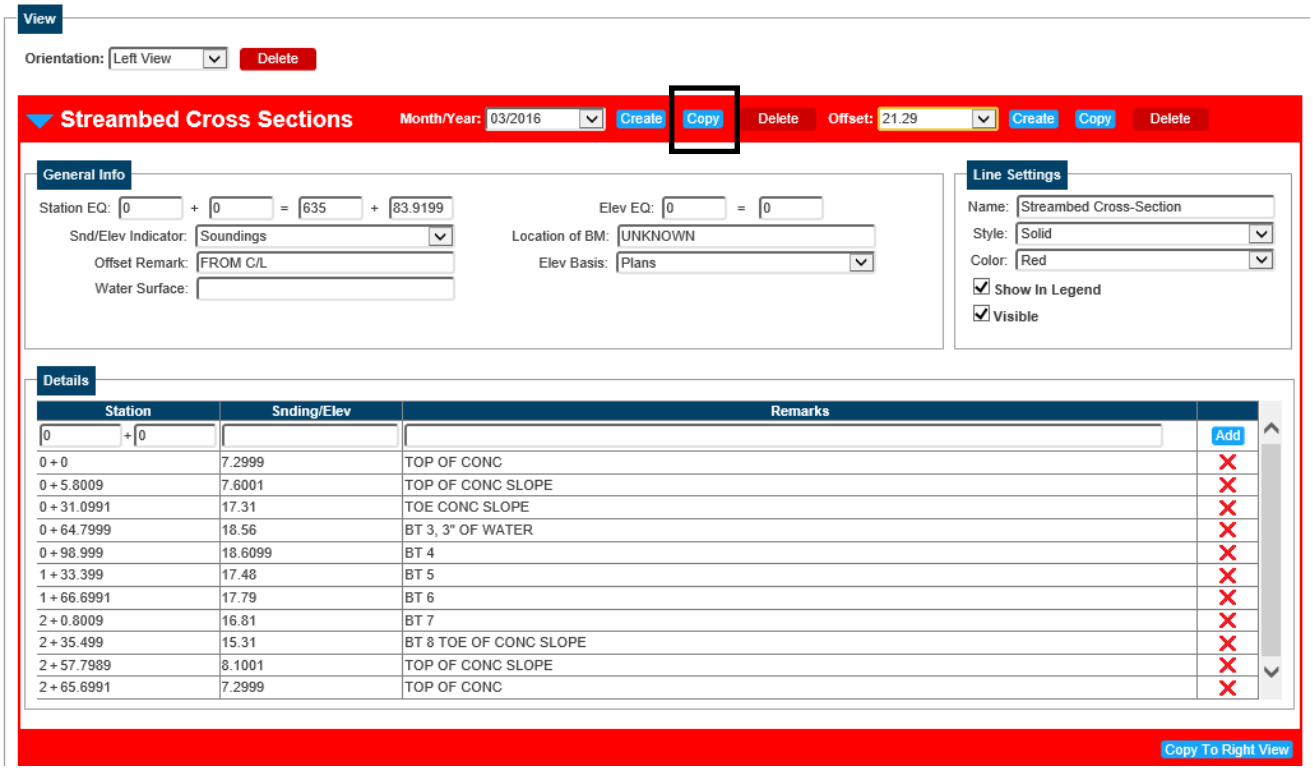


Figure 22

After you click **Copy**, you will update the month and year to reflect the date of the current streambed cross section. Once your new streambed cross-section date is selected, click **Add** to the right of the Month/Year, highlighted in back in Figure 23. After adding this date, you will be able to add new stations as well as modify existing stations, soundings/elevations, and remarks from the previous entry.

After making all necessary edits, click **Save**. At this point you should select the other view (Left or Right) and repeat these steps to update the streambed cross section for the opposite view.

If you would like to take multiple measurements, one at the left face of the structure and another further upstream, you must create more than one **Offset** to collect data. Most agencies choose to define the offset as the distance from the bridge centerline.

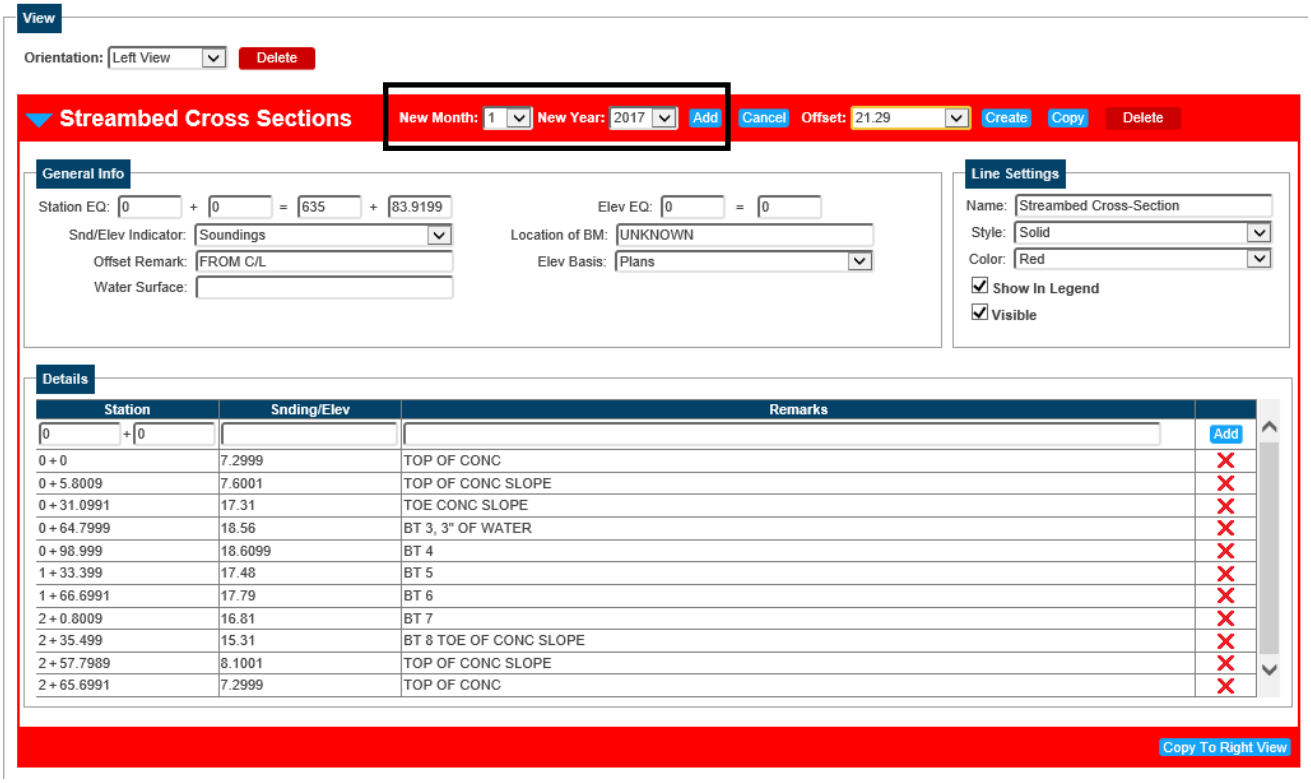


Figure 23

4.5 : Graph

To View Structure/Sounding Graph

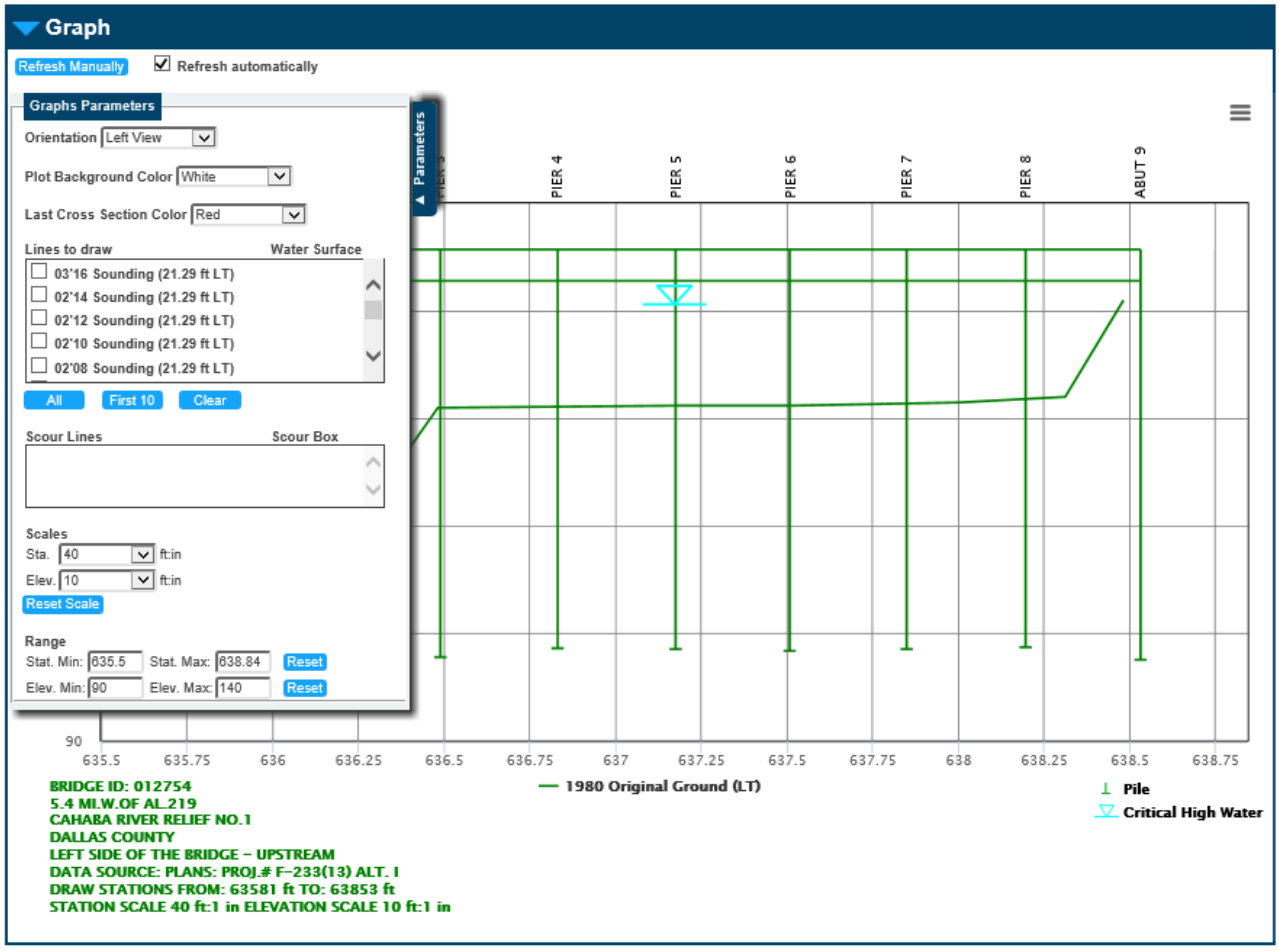


Figure 24

The *Graph* pane contains the graph which will update as the details of the following panes are filled in. This pane (Shown in Figure 24) allows you to view the Structure Detail, Streambed Cross Section Lines, Scour Evaluation Lines & boxes, High Water Elevation, Water Surface Elevations, Bridge Identification information, as well as print or download your plots.

The following is a list of the valid fields on this screen. A brief explanation of each is included.

Graph Parameters

Refresh Manually and **Refresh Automatically**

The graph has two controls in the top-left corner which display permanently. **Refresh Manually** prods the graph to redraw, and checking the **Refresh automatically** checkbox will have the graph update as new data is entered. For extremely large structures, it may be faster to turn this refreshing property off. But checking the graph regularly will help the user to identify data errors before too much is entered.

Orientation

This field is used to select the orientation of the bridge you wish to display, whether it be the Left or Right View.

Background Color

Background Color changes the background of the graph, with the white setting looking more like paper or excel, while the black setting closer resembles a CAD application.

Last Cross Section Color

This selection allows you to change the color of the most recent sounding line so that it stands out from the rest of the sounding lines.

Lines to draw

The list of possible lines to draw are listed in chronological order with the most recent at the top. As the lines are selected, they will populate on the graph. If water surface elevations are selected, they too will display on the graph. There are additional buttons to aid with selecting multiple lines at a time, allowing the user to select All of the lines, the First 10 lines, or to Clear all the selections.

Water Surface

This portion of the field will show a box that you can check if a water surface elevation was entered for this sounding in the **Streambed Cross Sections** panel. If this box is checked it will show the location of that elevation on the plot.

Scour Lines

If scour evaluation lines are available, each event will be listed in the “Scour Lines” field. Scour Evaluation Lines are not available for all structures. If this box is checked it will show the **Scour Lines** on the plot.

Scour Box

If scour lines are available, each event will also show a box to include the **Scour Box** on the plot. If the box is checked, a box with the scour data appears at the bottom of the graph. You can only view the data for the first 20 piers in the scour box, to view data from particular piers, you may have to manually zoom in on certain parts of the structure.

Scale

The graph scales can also be manually adjusted. Select a *Stationing scale* or *Elevation scale* to adjust how the graph appears. Select **Reset Scale** to return the graph to an automatically selected scale.

Reset

If you narrow in on a specific station or elevation, you can press **Reset** to return to the full extents of the graph.

Manual Zoom

To manually zoom in on any part of the structure, left click your mouse in the graph area and drag it to create

the field of view desired, then release the mouse. To return to the full extent view, click **Refresh Manually**.

Legend

The legend, located in the bottom middle and right side of the graph. The middle portion lists the different lines and their associated dates that are plotted. The right-side portion of the legend shows the different symbols that are plotted on the graph, such as foundation type and critical high water mark.

Printing/Downloading

To print this view to scale, click the menu button in the top right corner of the panel and choose **Print chart**. If you want to download this view, click the menu button, and choose **Download PNG image**, **Download JPEG image**, or **Download PDF document**. See the red highlighted area in Figure 25.

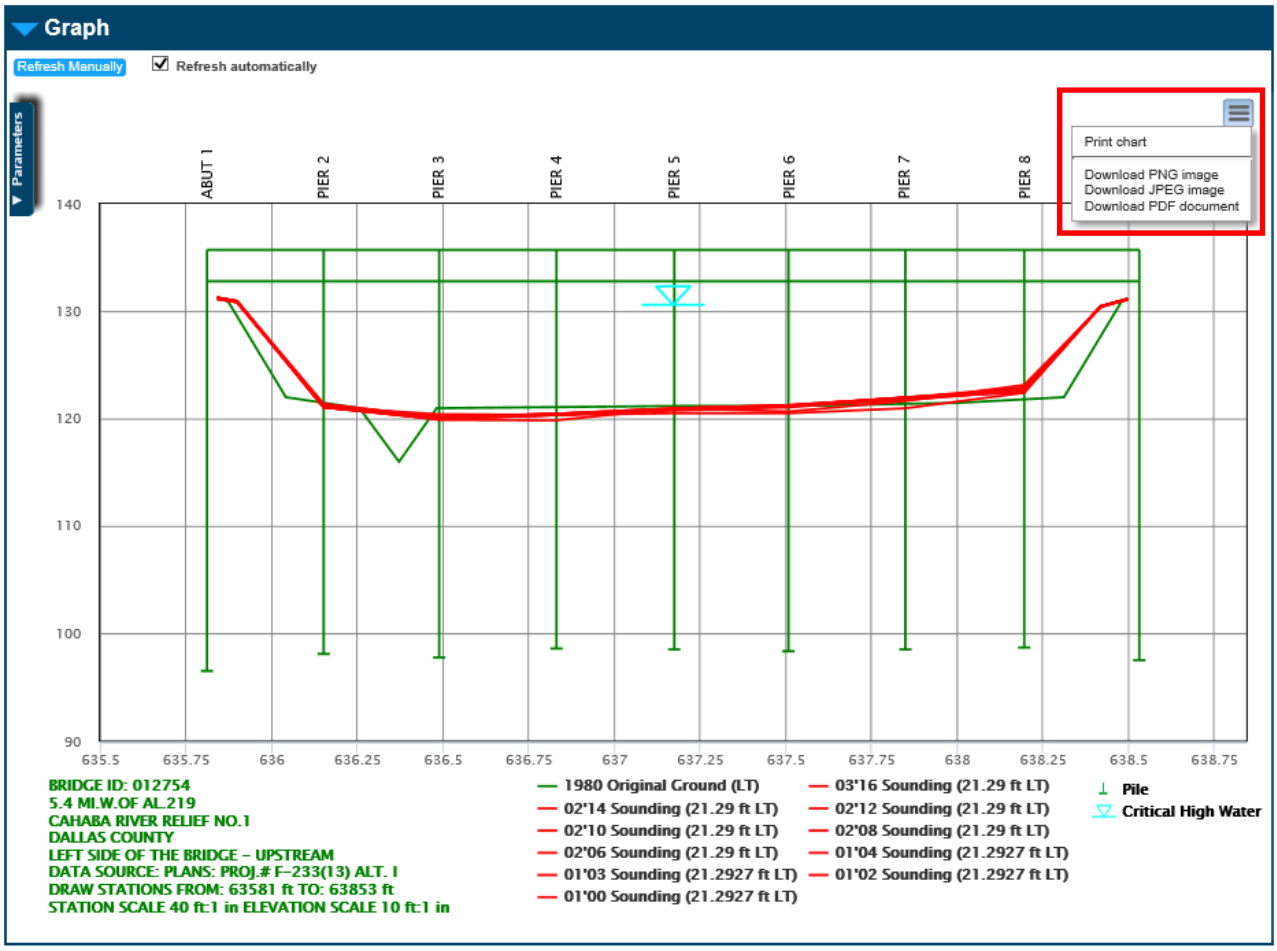
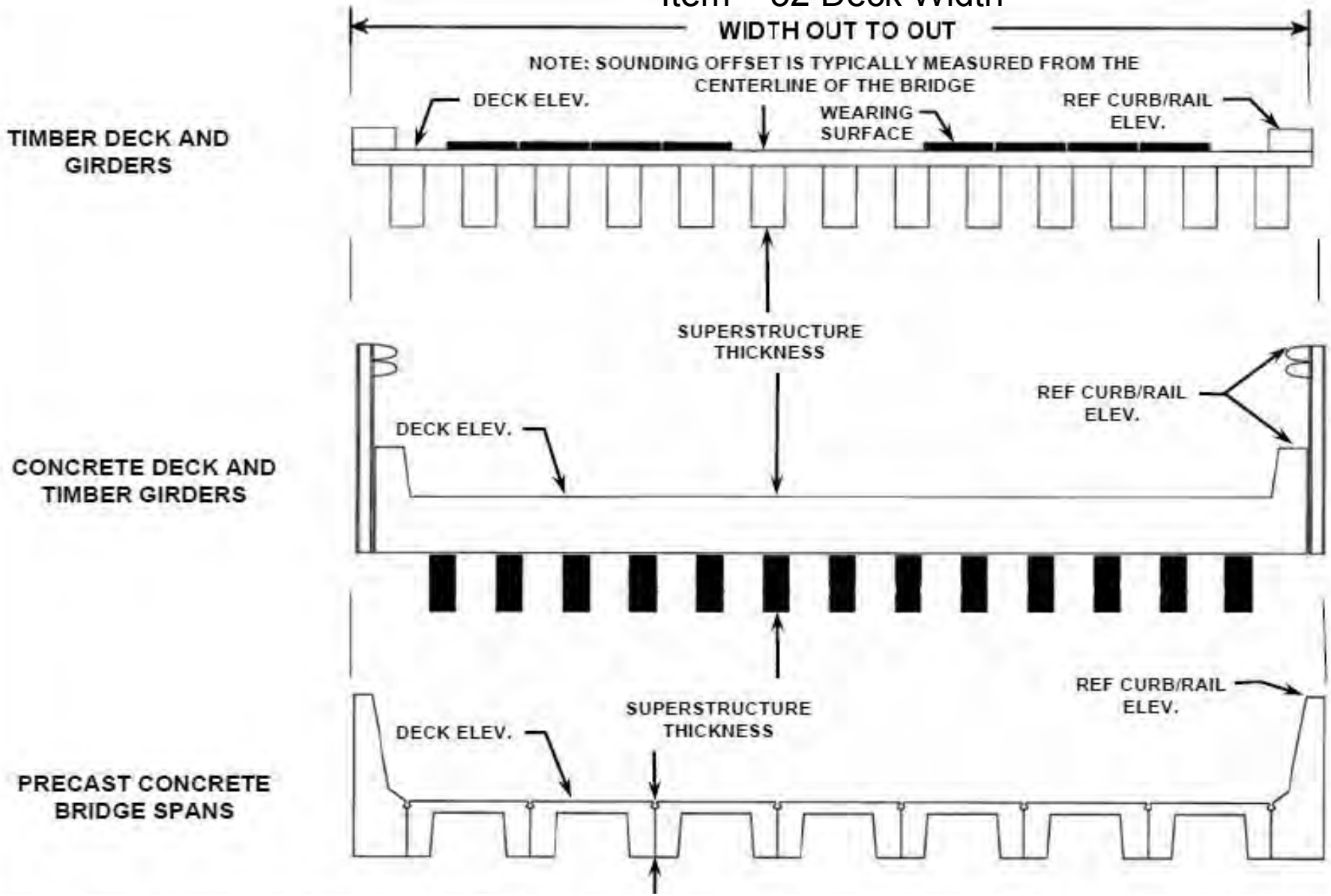


Figure 25

Structure Plan and Detail Components

Superstructure

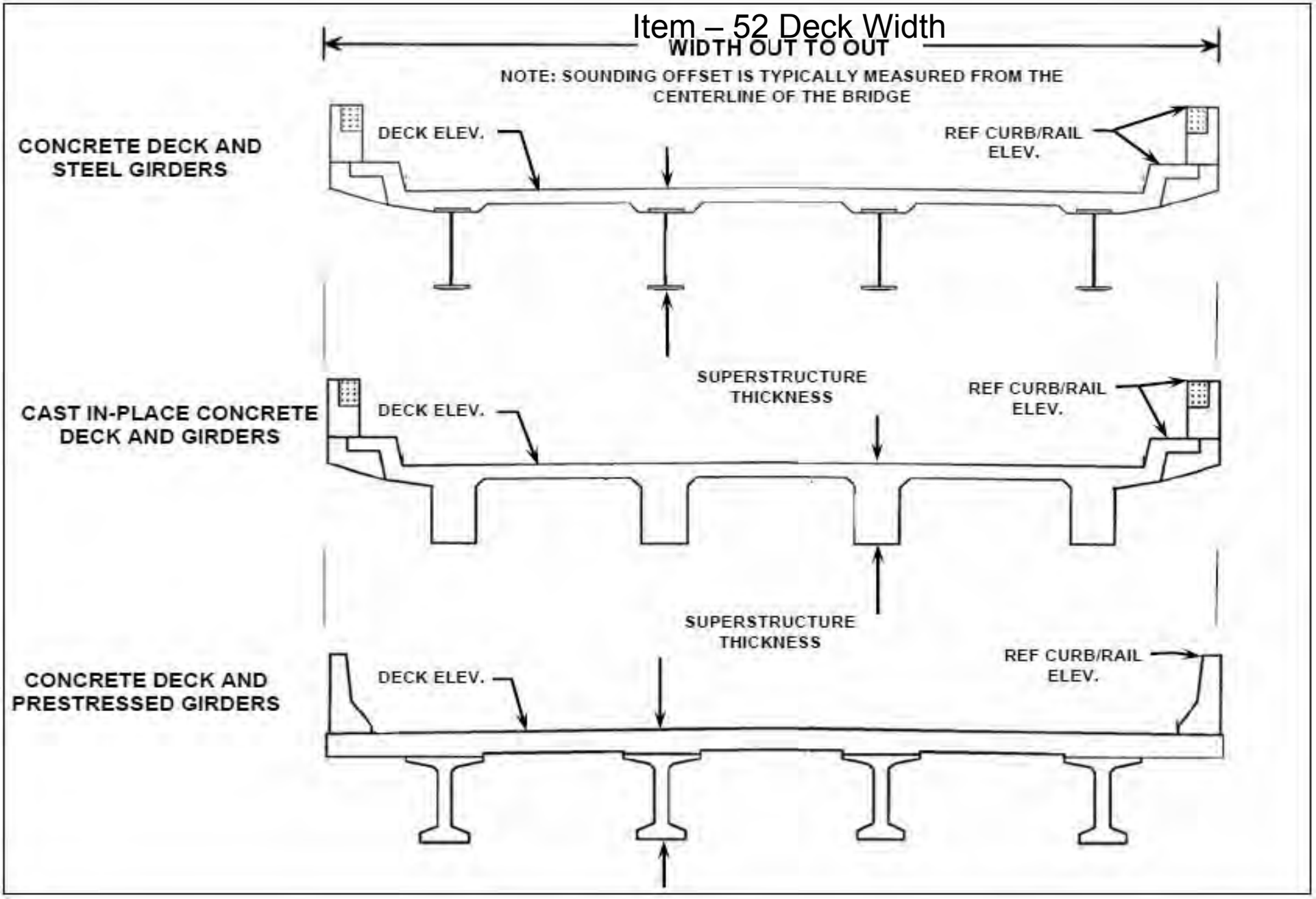
Item – 52 Deck Width



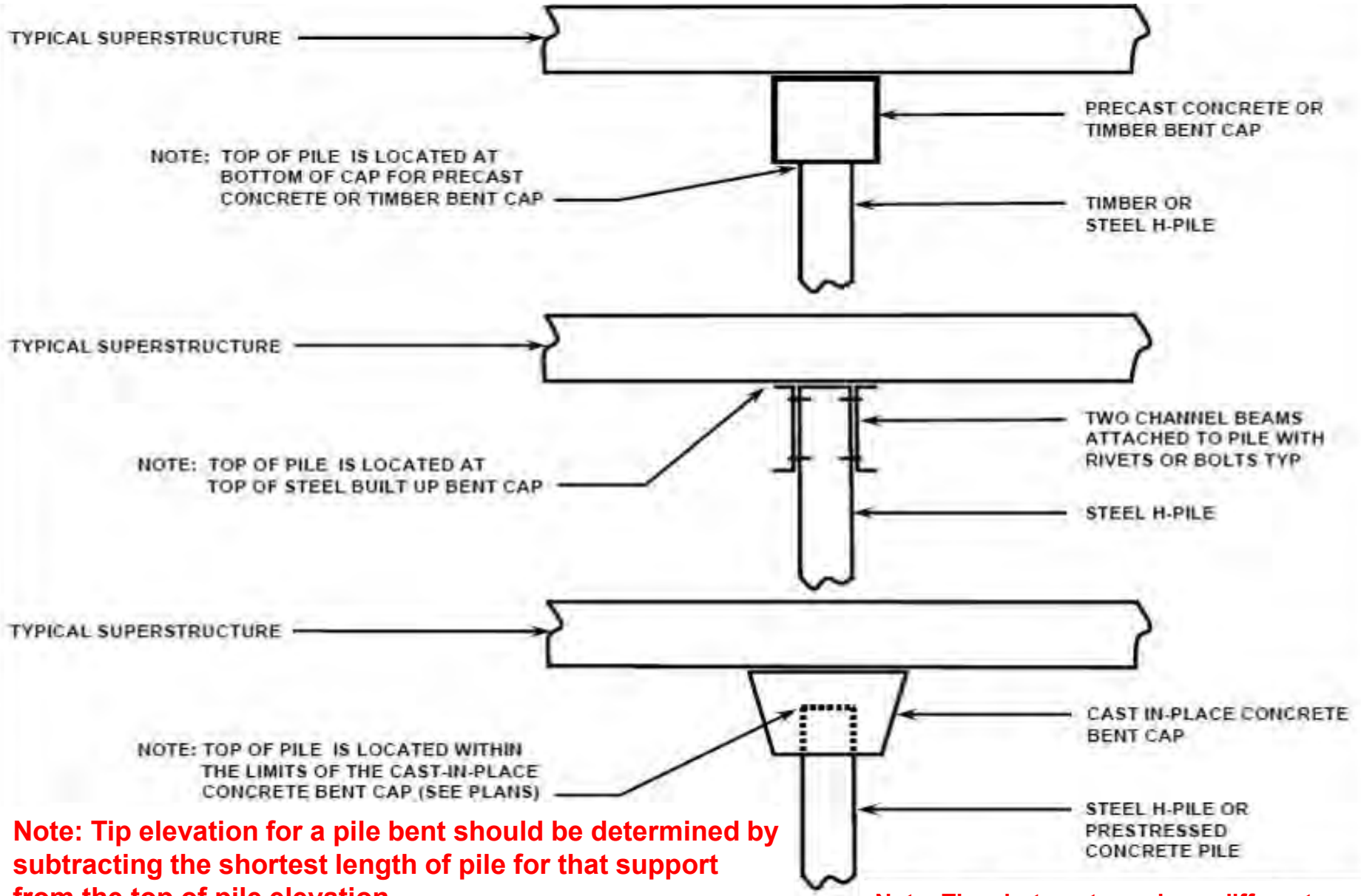
Note: Superstructure thickness is the distance from the finished grade to the low chord (low steel).

Superstructure

Item – 52 Deck Width



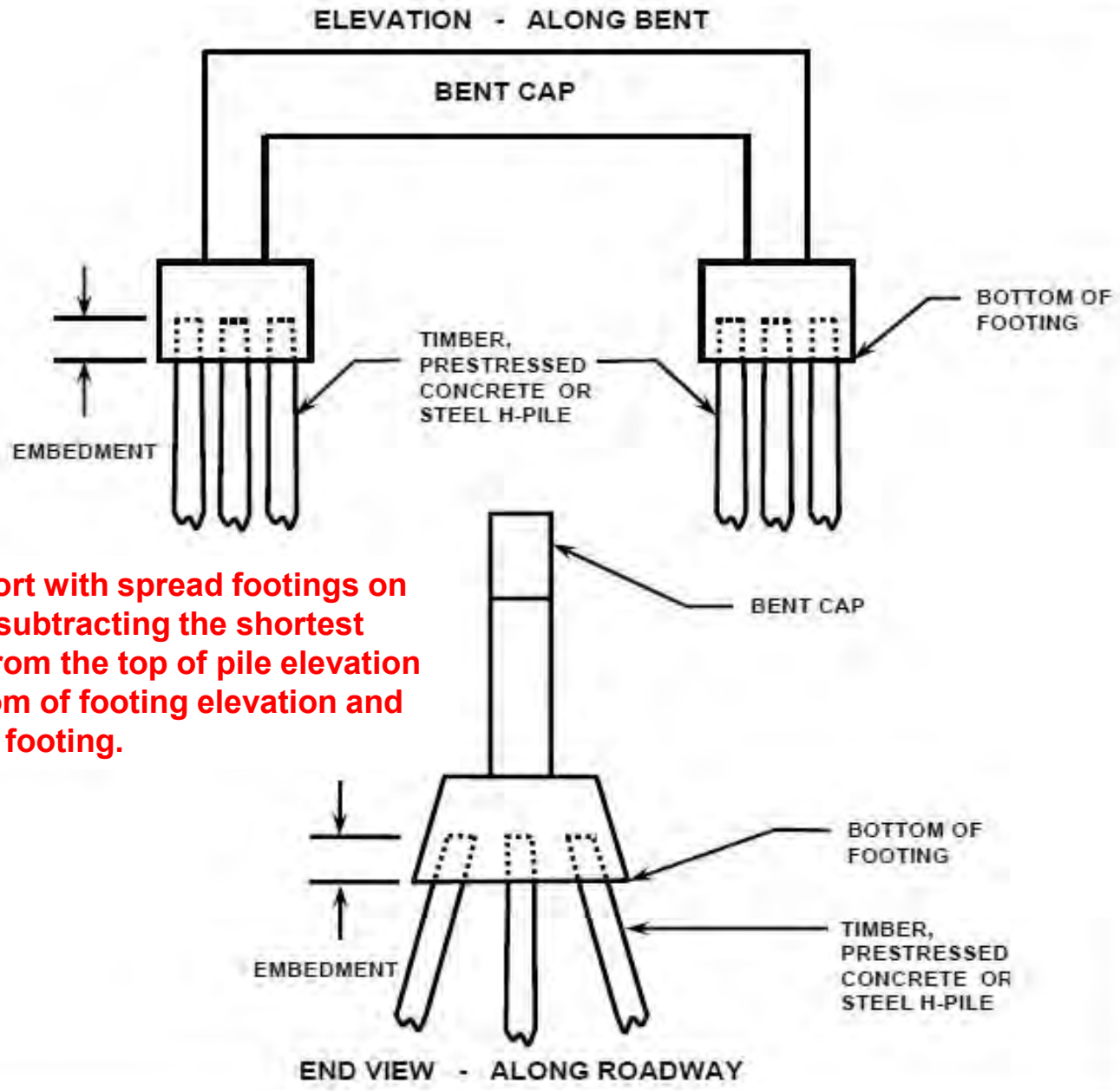
Substructure (Piling)



Note: Tip elevation for a pile bent should be determined by subtracting the shortest length of pile for that support from the top of pile elevation.

Note: The abutment may have different cap dimensions and/or top of pile elevation.

Substructure Spread Footing On Piles



Note: Tip elevations for a support with spread footings on piles should be determined by subtracting the shortest length of pile for that support from the top of pile elevation which is determined from bottom of footing elevation and respective embedment into the footing.

Timber Pile Records

Timber Pile Records May Note: Actual Length in Structure –OR- Furnished Length Allowed

Cut off to Ground = Top of Pile to Groundline

Form C-16E

Bridge

STATE HIGHWAY DEPARTMENT OF ALABAMA
DRIVING RECORD OF TIMBER PILING

County Montgomery Division 7 Project No. S-302(2) Prop "B"
Road between Lapine and Ramer
Bridge: Station 4+00 to Station 4+92
Contractor Cox Const. Co. Sub-Contractor Inspector Lewis
Bents numbered as per plans if shown, otherwise numbered from north on east end. Piles numbered from left to right.
Weight of (drop) (~~steam~~) hammer 2,230 Type

Date	No. Bents	No. Pile	Size of Pile: Tip	Butt	Fur. Length	Ordered Length	Actual Length in Str.	Length Cut Off	Last 10 Blows: Drop of Hammer	Penetr. 10 Blows	Total Penetr	Kind of Soil	Computed Bearing	Cut Off to Ground
1/12/59	1	1	9½"	12"	25.0'	25.0'	15.70'	9.30'	10'	¾"	15.70'	Marl	20.7	0.00'
1/9/59	"	2	10½"	14"	25.0'	25.0'	14.17'	10.83'	10'	1½"	11.96'	"	19.4	2.71'
1/9/59	"	3	10¼"	14½"	25.0'	25.0'	12.78'	12.22'	10'	½"	11.65'	"	21.2	1.13'
1/9/59	"	4	10¼"	14"	25.0'	25.0'	12.04'	12.96'	10'	¾"	9.79'	"	20.7	2.25'
1/9/59	"	5	10⅞"	14¼	25.0'	25.0'	14.79'	10.21'	10'	1"	11.96'	"	20.3	2.83'
1/9/59	"	6	10¼'	13"	25.0'	25.0'	14.71'	10.29'	10'	1"	11.46'	"	20.3	3.25'
1/9/59	"	7	10⅞"	15"	25.0'	25.0'	17.20'	7.80'	10'	¾"	11.30'	"	20.7	5.90'
1/9/59	2	1	10½'	12"	25.0'	25.0'	13.64'	11.36'	10'	¼"	9.18'	"	21.8	4.46'
1/9/59	"	2	11½'	16"	25.0'	25.0'	14.08'	10.92'	10'	½"	9.19'	"	21.2	4.89'
1/9/59	"	3	12½"	16'	25.0'	25.0'	14.05'	10.95'	10'	1"	9.51'	"	20.3	4.54'
1/9/59	"	4	12"	12½"	25.0'	25.0'	15.08'	9.92'	10'	1½"	10.33'	"	19.4	4.75'
1/9/59	3	1	9½"	13"	25.0'	25.0'	19.34'	5.66'	10'	1½"	7.09'	"	19.4	12.25'
1/9/59	"	2	10½"	15"	25.0'	25.0'	20.06'	4.94'	10'	1⅛"	13.06'	"	19.8	7.00'
1/9/59	"	3	10½'	13½"	25.0'	25.0'	20.96'	4.54'	10'	1¼"	13.29'	"	19.8	7.17'
1/9/59	"	4	10"	12"	25.0'	250	20.33'	4.67'	10'	1½"	13.00	"	19.4	7.33'
						Total	Total	Total						

Correct _____ Resident Engineer
Approved _____ Division Engineer

Show changes in plans on back of this she

Total Penetration

Steel Pile Records

Steel Pile Records May Note: Actual Length in Structure

Cut off to Ground = Top of Pile to GroundLine

STATE HIGHWAY DEPARTMENT OF ALABAMA
DRIVING RECORD OF STEEL PILING

County Lawrence Division First Project S-779 (2)

Road between Five Points and Morgan County Line

Bridge: Station 47+28 to Station 49+44

Contractor Brooks7 Nelson Sub-Contractor Reynolds Co. Inspector Wallace White

Bents numbered as per plans if shown, otherwise numbered from north or east end. Piles numbered from left to right.

Weight of (drop) (steam) hammer 3,100 Type steel Size of Piling 10" H Beam

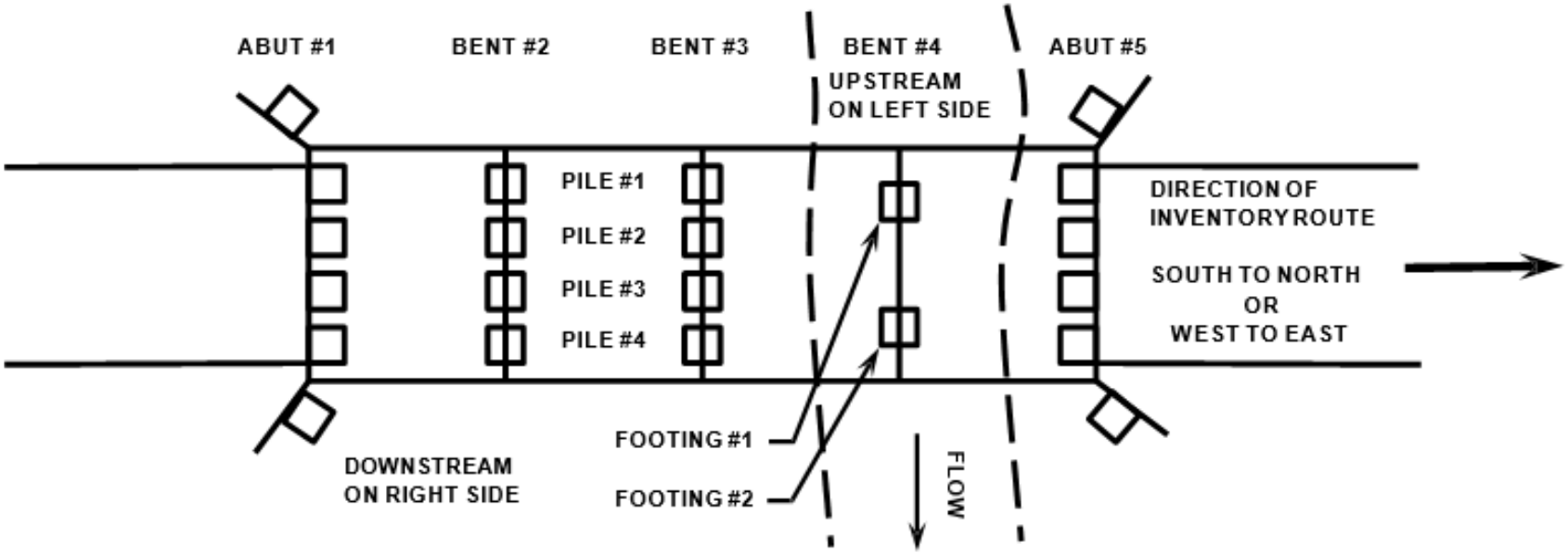
Date	No. Bent	No. Pile	Pay Splices	Added Pile	Pure. Length	Ordered Length	Actual Length in Str.	Actual Length Cut Off	Length Per Cut Off	Last 10 Blows: Drop of Hammer	Last 10 Blows: Penetration	Total Penetration	Kind of Soil	Corrugated Bearing	Cut Off to Ground
11-16-56	1	1			40	30	22.7	7.3		10'	2"	18.0	Clay	26.[illegible]	4.7
16	1	2			40	30	21.2	8.8		10'	2"	18.2	"	26.5	3.0
16	1	3			40	30	22.[illegible]	8.0		10'	2 5/8"	18.8	"	26.0	3.2
16	1	4			40	30	21.[illegible]	8.6		10'	2	18.4	"	26.[illegible]	3.0
16	1	5			40	30	22.5	7.5		10'	2	18.3	"	26.[illegible]	4.2
11-16-56	2	1			40	30	22.5	7.5		10'	1-3/4	10.6	"	27.1	11.7
16	2	2			40	30	22.3	7.7		10'	1-1/2	10.[illegible]	"	27.6	11.8
16	2	3			40	30	22.5	7.5		10'	1-1/2	10.[illegible]	"	27.6	12.0
16	2	4			40	30	22.6	7.4		10'	1-3/4	10.6	"	27.1	12.0
11-17-56	3	1			40	30	25.1	4.9		10'	1-3/4	10.3	"	27.[illegible]	14.8
17	3	2			40	30	25.1	4.9		10'	1-1/2	9.7	"	27.[illegible]	15.4
17	3	3			40	30	24.8	5.2		10'	1-1/2	9.2	"	27.6	15.6
17	8	4			40	30	25.3	4.7		10'	1-3/4	9.5	"	27.1	15.8
			Total	Total	Total	390 Total	500.4 Total	90.0 Total	Total						

Correct E. M. Nash Asst. Co. Engr. Approved L. D. Burnum Division Engineer

Show changes in plan on back of this sheet

Total Penetration

Bent Numbering and Station Direction



- Typical Support Mechanism – Pile, Spread Footing, Drilled Shaft, Etc.

Bent Numbering and Station Direction

- **Stream flow and components of a bridge structure are referenced in accordance to the inventory route direction.**

- **The direction of the inventory route is generally defined as South to North for odd numbered routes and West to East for even numbered routes.**

- **The direction of stream flow (upstream/downstream) is referenced to the direction of the inventory route and is to be coded on the Bridge Hydrology portion of the structure detail observation task.**

- **The numbering of the support mechanisms on any given abutment or bent shall always be associated left to right according to the direction of the inventory route. Support mechanism "1" is always located on the far left and the higher number (by succession) located on the right.**

- **The bent direction associated with the scour items portion of the Structure Detail Observation Task shall always be left blank or coded "I" for increasing. This enables the route direction and bent numbering to always remain left to right on the sounding plots.**

Bent Numbering and Station Direction

- **In some cases, bridge structures were designed and/or constructed in the opposite direction of the inventory route direction. This occurs when the direction of increasing stationing for a structure is in the opposite direction of the inventory route direction. This can lead to some confusion when bridge components or streambed information is discussed by different agencies or entities. The following information should aid bridge inspection personnel concerning this matter:**

  - **The station direction coded in the Scour Items portion of the Structure Detail Observation shall be coded "D" for decreasing stations. This enables the stationing of a structure to be shown in accordance to the inventory route direction on the sounding plots.**

  - **For correcting old streambed data or entering streambed data for a new structure in BrM that has decreasing stations, all data should be collected in the direction of increasing stations and entered into BrM for the left/right side as determined by the inventory route direction.**

Caution should be used in determining the support mechanism elevations for a given abutment or bent. They may not have been constructed in the opposite direction of the inventory route.

THE "EASY BUTTON" METHOD

Use assumed stations and elevations when entering structure and streambed data into BrM. Data should be entered in the direction of the inventory route. Make clear notes to the bridge structure file as to the methodology of collecting and entering the respective data into BrM.

Procedure For Taking Streambed Cross Sections

ALABAMA DEPARTMENT OF TRANSPORTATION
MAINTENANCE BUREAU
REVISED 1/13/2015

PROCEDURE FOR TAKING STREAM AND FLOODPLAIN CROSS SECTIONS FROM BRIDGE DECKS

1. Cross sections are to be taken from the bridge deck along each side of a structure across a stream or floodplain within the limits of the structure. All breaks in the groundline, especially in the streambed, and at the banks, and intermediate piers shall be measured so that accurate cross sections of the stream or floodplain may be established. The location of the water surface (edge of water) should be recorded for each cross section.

2. Normally, cross sections are to be taken parallel to and along the outside limits of the structure. Usually, this will be from along the top of the handrails, barrier rails, guardrails, curbs, or parapets of the bridge. In the case of culvert-type structure, it may be from along the top of the handrails, barrier rails, guardrails, curbs, parapets, flow line, or the "apron". An "apron" is a normally flat section of concrete poured between the wing walls of a culvert for the purpose of eliminating or reducing the effects of scour at or near the ends of the barrels.

3. Cross sections are required on all structures that are scour prone or scour critical. This will include bridges defined as relief structures or as any structure over water. Any bridge coded '0-4' for Item 42B - Type of Service Under on the Inventory-Admin Subtask, and also have Item 113 - Scour Critical on the Appraisal Task coded as 'N', are not over water and will NOT need to be profiled.

4. Cross sections are to be taken at least every 24 months unless Item 224B –Scour Monitoring Frequency requires them to be taken more frequently. Any special monitoring requirements as indicated by a code of "1" in Item 224C - Special Inspection Detail Indicator are placed on the Bridge Notes Task. These requirements may also indicate additional cross sections to be taken.

5. Permanent points to be used in the cross sectioning shall be established prior to taking the cross sections. The locations of the permanent points shall be determined for each bridge and for each side of the bridge. These points shall then be permanently marked and identified for positive future reference and location. The markings for the permanent points may be of paint or other markings or markers set on or into the handrail, barrier rail, guardrail, curb, or parapet of the bridge.

Culvert-type structures may present some difficulty in finding an appropriate location for marking the permanent points. However, where appropriate and practical, culverts should have permanent points marked.

Also, for culvert-type structures, if an "apron" exists between the wing walls, the cross sections shall be taken immediately beyond the limits of the "apron".

The location, size and color of the markings for the permanent points should be carefully evaluated before they are installed. In no case should the markings be detrimental to the physical condition of the bridge or to the aesthetics of the bridge. The markings should not be obtrusive. The markings must not be distracting or misleading to the traveling public in that they should not be confused with any traffic control features.

6. All important structural, channel, or construction break points shall be identified and marked as a "permanent point". These shall include but not be limited to the following:

- Top, bottom, and break points in slope paving
- Top, bottom, and break points in riprap
- Limits of access roads or ramps

- Location of cofferdams
- Location of sheet piling
- Location of pier protection structures, such as dolphins
- Location of abutments, piers, bents, and all supporting elements
- All known major obstructions within the limits of the bridge

7. Where structures are unusually high, the water is deep, the water velocity is excessive, or where unusual hazardous conditions exist, assistance in completing the cross sections may be requested from the Maintenance Bureau. In this case, a state diver or other representative of the Maintenance Bureau will review and evaluate the bridge site and will coordinate the work with the division.

8. Cross section data may be taken and recorded relative to a reference data line as follows:

For bridge-type structure of any length on a zero percent (0%) grade:

- Use the top of handrail, barrier rail, guardrail, curb, or parapet;

For bridge-type structures of any length on a grade or in a vertical curve:

- Use elevations;

- If the structure detail information is entered correctly in the AASHTOware Bridge Management System, use the top of handrail, barrier rail, guardrail, curb, or parapet;

For culvert-type structures of any length:

- Use the top of handrail, barrier rail, guardrail, curb, parapet, flow line or the "apron".

9. The cross section data shall be recorded and preserved as a permanent source document record. Copies of the cross section data and its plotted results should be included in the bridge folder.

10. In all cases, the current cross sections shall be plotted and/or compared concurrently with all previous cross sections. Any confirmed or suspected changes in the streambed or floodplain which, in the opinion of either the Division Maintenance Engineer, County Engineer, or Bridge Inspector, is threatening to the structure or to the traveling public shall be investigated to determine the meaning and severity of the change, and if appropriate, the Maintenance Bureau in the Central Office should be notified as soon as possible.

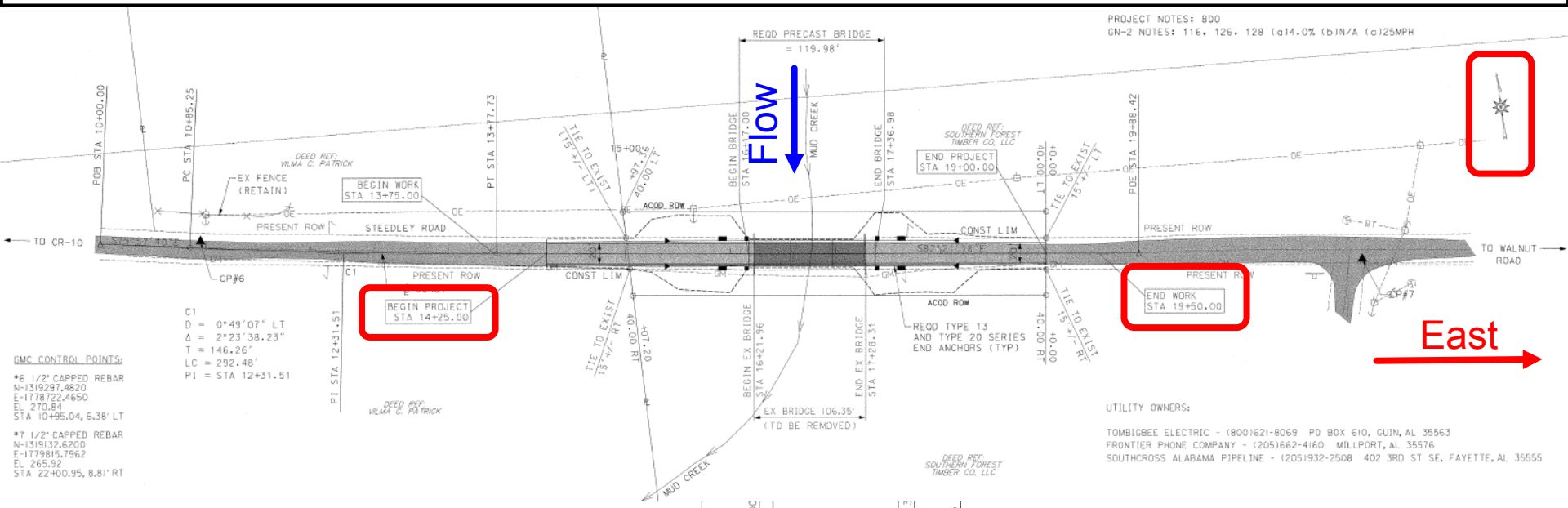
11. It should be noted that the intent of these procedures is that streambed and floodplain cross sections are taken at regular and timely intervals at all structures subject to scour; that these cross sections are to be accurate enough to be compared with any and all existing cross sections; that the comparison of these cross sections be used to locate and identify existing and potential scour sites; and to plan remedial action plans in order to avoid scour related problems.

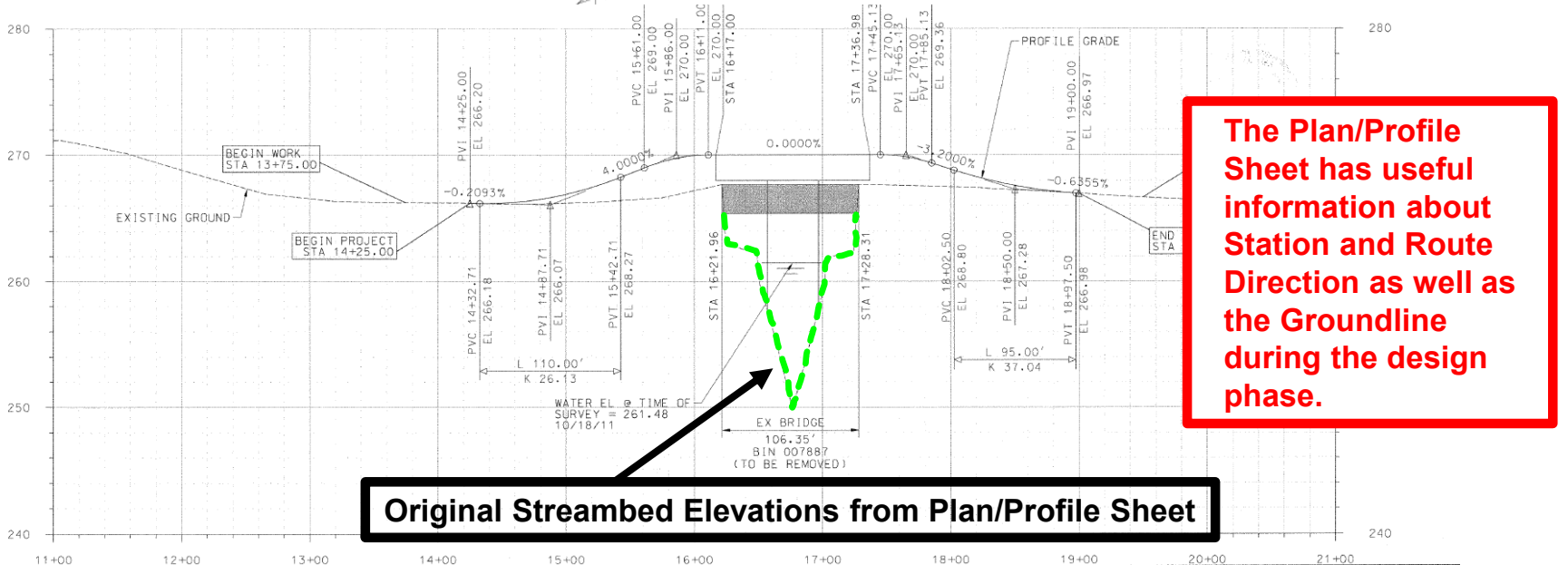
Streambed

The following plan information is useful in entering data in the Cross Section Module of the AASHTOWare Bridge Management System (BrM) to produce Graphs of a structure.

Plan / Profile

Note: For this bridge, the route direction is West to East with upstream located on the Left Side. Station direction is also in the direction of the route, therefore, Station Direction is "Increasing" on the Structure Detail Information Task in ALDOT BrM.

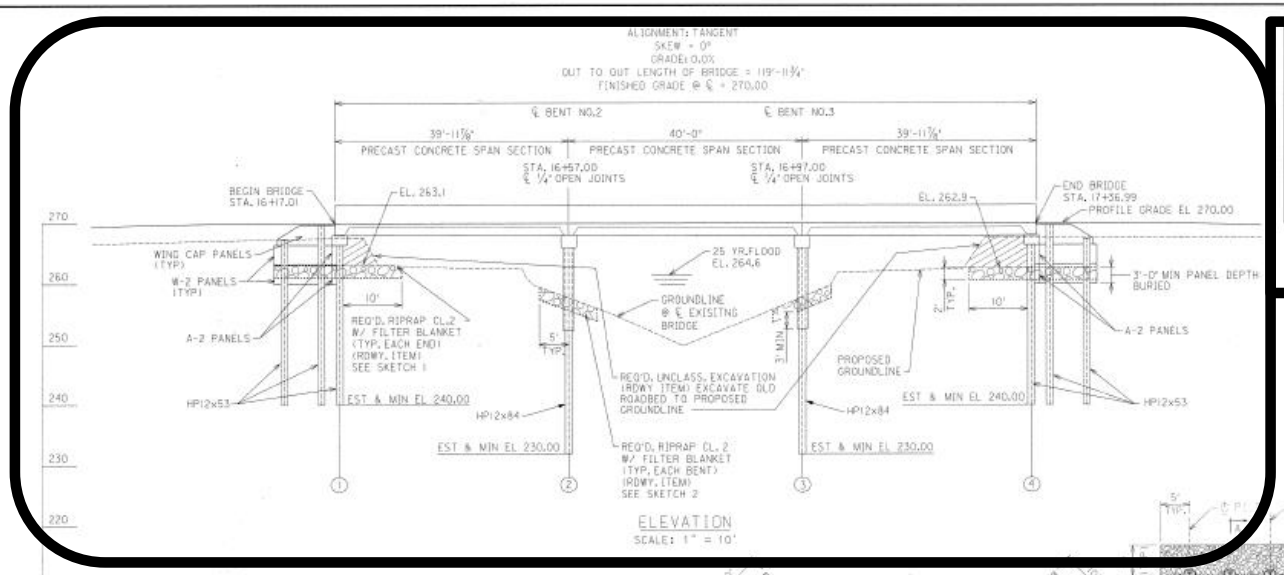




The Plan/Profile Sheet has useful information about Station and Route Direction as well as the Groundline during the design phase.

Original Streambed Elevations from Plan/Profile Sheet

Bridge Elevation Sheet



ELEVATION
SCALE: 1" = 10'

HYDRAULIC DATA

RECURRENCE INTERVAL (YR.)	DISCHARGE (CFS)	WATER SURFACE ELEVATION (FT.)
25	2985	264.6
50	3585	264.9
100	4235	265.3
200	4950	265.7
500	6045	266.1

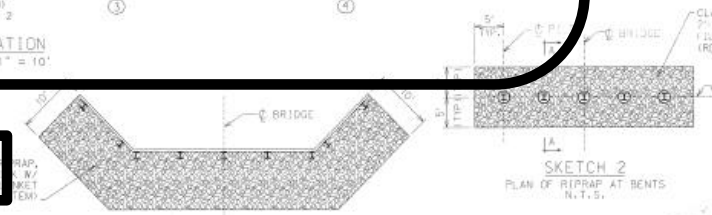
DRAINAGE AREA FOR BRIDGE = 14.5 SQ. MILES
V25 = 4.7 FT./SEC.
OPENING PROVIDED = 920 SQ. FT.

THE OVERTOPPING FLOOD EQUALS THE 25 YEAR FLOOD.
UPSTREAM STAGE = 265.95 FT

REFERENCE PROJECT NUMBER	FISCAL YEAR	SHEET NUMBER
BRZ-3800(213)	2014	5

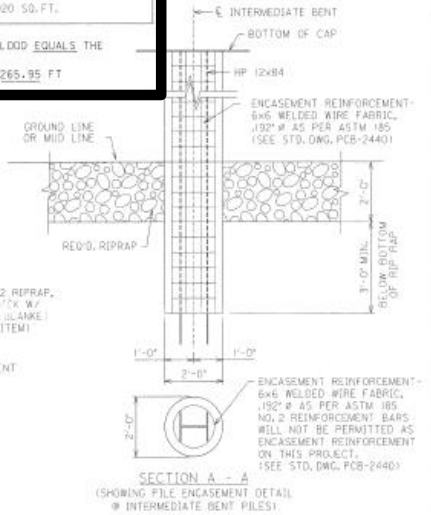
BRIDGE GENERAL NOTES

SEE STANDARD DRAWING NO. BGN-1
ROADWAY WIDTH 24'-6" WITH BARRIER RAIL
① ⑨ 1-A
② HS20-44 ⑩
⑤ ABUT. 24 TONS BENT 40 TONS ⑱



SKETCH 2
PLAN OF RIPRAP AT BENTS
N.T.S.

SKETCH 1
N.T.S.



SECTION A - A
(SHOWING PILE ENCASEMENT DETAIL @ INTERMEDIATE BENT PILES)
SCALE: 1" = 2'

See Following Pages for More Detail

ESTIMATE OF QUANTITIES

QUANTITY	ITEM	UNIT	DESCRIPTION
1	206A	LUMP SUM	REMOVAL OF OLD BRIDGE, STATION 16+21.36 TO STATION 17+28.31
340	502A	POUND	STEEL REINFORCEMENT (GRADE 60)
1	505A	EACH	STEEL TEST PILES (HP 12X53)
1	505A	EACH	STEEL TEST PILES (HP 12X84)
1	505B	EACH	STATIC LOADING TESTS (HP 12X53)
1	505B	EACH	STATIC LOADING TESTS (HP 12X84)
786	505M	LINEAR FOOT	STEEL PILING FURNISHED AND DRIVEN (HP 12X53)
418	505M	LINEAR FOOT	STEEL PILING FURNISHED AND DRIVEN (HP 12X84)
2	507A	EACH	WIRE ROPE ABUTMENT ANCHOR ASSEMBLY
16	510A	CUBIC YARD	BRIDGE SUBSTRUCTURE CONCRETE, CLASS A
40	511A	EACH	ELASTOMERIC BEARING TYPE 1
2	512A	EACH	PRECAST CONCRETE ABUTMENT CAPS, 2'-0" WIDE BY 1'-7" DEEP BY 28'-0" LONG
2	512B	EACH	PRECAST CONCRETE INTERMEDIATE BENT CAPS, 2'-0" WIDE BY 1'-7" DEEP BY 27'-6" LONG
15	512C	EACH	PRECAST CONCRETE TYPE 1 SPAN SECTION, 3'-6" BY 2'-0" DEEP BY 39'-11 3/4" LONG
6	512C	EACH	PRECAST CONCRETE TYPE 2C SPAN SECTION, 3'-6" BY 2'-0" DEEP BY 39'-11 3/4" LONG
2	512D	EACH	PRECAST CONCRETE BARRIER RAIL INTERMEDIATE SECTION, 39'-11" LONG
4	512D	EACH	PRECAST CONCRETE BARRIER RAIL END SECTION, 39'-11 3/8" LONG
16	512E	EACH	PRECAST CONCRETE ABUTMENT PANELS, TYPE A2, 6'-1" LONG
8	512F	EACH	PRECAST CONCRETE WING PANELS, TYPE W2
4	512G	EACH	PRECAST CONCRETE ABUTMENT WING CAP PANELS

REQUIRED

3-- 40' PRECAST CONCRETE SPANS W/ BARRIER RAIL--------- BRIDGE SHEET NO. 1 AND STANDARD DRAWING NO. PC-40
PRECAST CONCRETE BARRIER RAIL---------- BRIDGE SHEET NO. 1 AND STANDARD DRAWING NO. PCBR-1(40)
2-- PRECAST CONCRETE ABUTMENT CAPS WITH STEEL PILES-- BRIDGE SHEET NO. 1 AND STANDARD DRAWING NO. PCA-2440
2-- PRECAST CONCRETE BENT CAPS WITH STEEL PILES------- BRIDGE SHEET NO. 1 AND STANDARD DRAWING NO. PCB-2440
PRECAST CONCRETE ABUTMENT PANELS---------- BRIDGE SHEET NO. 1 AND STANDARD DRAWING NO. PCP-2400
TEST BORINGS---------- BRIDGE SHEET NO. 2
BRIDGE GENERAL NOTES---------- STANDARD DRAWING BGN-1
STANDARD FOR STANDARD DETAILS---------- STANDARD DRAWING 1-13

SPECIAL NOTES

1) PILE ENCASEMENTS SHALL EXTEND A MINIMUM OF 3 FEET BELOW BOTTOM OF RIPRAP. PILE ENCASEMENTS SHALL EXTEND TO BOTTOM OF CAP.
2) THE FURNISHING OF ALL NECESSARY EQUIPMENT AND THE CONSTRUCTION OF ALL SHEETING AND SHORING, CRIBS, COFFERDAMS, CAISSONS, DEWATERING, ETC. WHICH MAY BE NECESSARY FOR THE CONSTRUCTION OF PILE ENCASEMENTS SHALL BE A SUBSIDIARY OBLIGATION OF 510A, BRIDGE SUBSTRUCTURE CONCRETE.
3) NO SUBSTITUTIONS OF ALTERNATE SPAN ARRANGEMENTS SHALL BE ALLOWED.
4) 1 STATIC PILE TEST SHALL BE PERFORMED AT ℄ BENT NO. 3 FOR HP12x84 PILE. 1 STATIC PILE TEST SHALL BE PERFORMED AT ℄ ABUTMENT NO. 4 FOR HP12x53 PILE.
5) ACCESS TO THE FOUNDATION REPORT AND CORE BORINGS CAN BE ARRANGED BY CONTACTING TTL INC 3516 GREENSBORO AVE, TUSCALOOSA, AL 35401
6) PILES USED IN WING PILES SHALL BE DRIVEN TO REFUSAL OR 30', WHICHEVER IS LESS. MINIMUM PILE TIP ELEVATIONS FOR ABUTMENT PILES, INTERIOR BENT PILES AND PILES USED IN THE WIRE ROPE ASSEMBLIES WERE DETERMINED BY TTL. THE MINIMUM PILE TIP ELEVATION FOR ABUTMENT PILES AND PILES USED IN THE WIRE ROPE ASSEMBLIES IS 240.00. THE MINIMUM PILE TIP ELEVATION FOR INTERIOR BENT PILES IS 230.00. ABUTMENT PILES, INTERIOR BENT PILES AND PILES USED IN THE WIRE ROPE ASSEMBLIES SHALL BE DRIVEN TO MINIMUM TIP ELEVATION OR REFUSAL, WHICHEVER IS DEEPER.

ACCEPTED BY:
BRIDGE ENGINEER
2-21-14

THESE DRAWINGS REPRESENT DESIGNS PREPARED FOR USE BY THE ALABAMA DEPARTMENT OF TRANSPORTATION, AND ARE NOT TO BE COPIED, REPRODUCED, ALTERED, OR USED BY ANYONE, OR ANY ORGANIZATION, WITHOUT THE EXPRESSED WRITTEN CONSENT OF THE ALABAMA DEPARTMENT OF TRANSPORTATION REPRESENTATIVE AUTHORIZED TO APPROVE SUCH USE. ANYONE MAKING UNAUTHORIZED USE OF THESE DRAWINGS MAY BE PROSECUTED TO THE FULLEST EXTENT

TE 180

I CERTIFY THAT COMPLETE REVIEWS OF THE DESIGNER'S CALCULATIONS, CONTRACT STRUCTURAL DRAWINGS, APPLICABLE SPECIFICATIONS, AND SPECIAL PROVISIONS HAVE BEEN MADE BY COMPETENT ENGINEERS OF THIS ORGANIZATION, AND THAT THESE PLANS ARE ACCURATE, COMPLETE, AND SUITABLE FOR LETTING.

APPROVED: David S. Haygood DATE: 2/13/14
(Engineer of Record's Signature)
REGISTRATION NO. 21220

APPROVED: G.P. Willis DATE: 2/13/14
(Reviewing Engineer of Record's Signature)
REGISTRATION NO. 27444

James C. Smith
LAMAR COUNTY ENGINEER

ALABAMA DEPARTMENT OF TRANSPORTATION

BRIDGE SHEET NO. 1 OF 2
REVISIONS

PROJECT NO. BRZ-3800(213)
BRIDGE ON STEEDLEY ROAD
OVER MUD CREEK
AT STA. 16+17.00

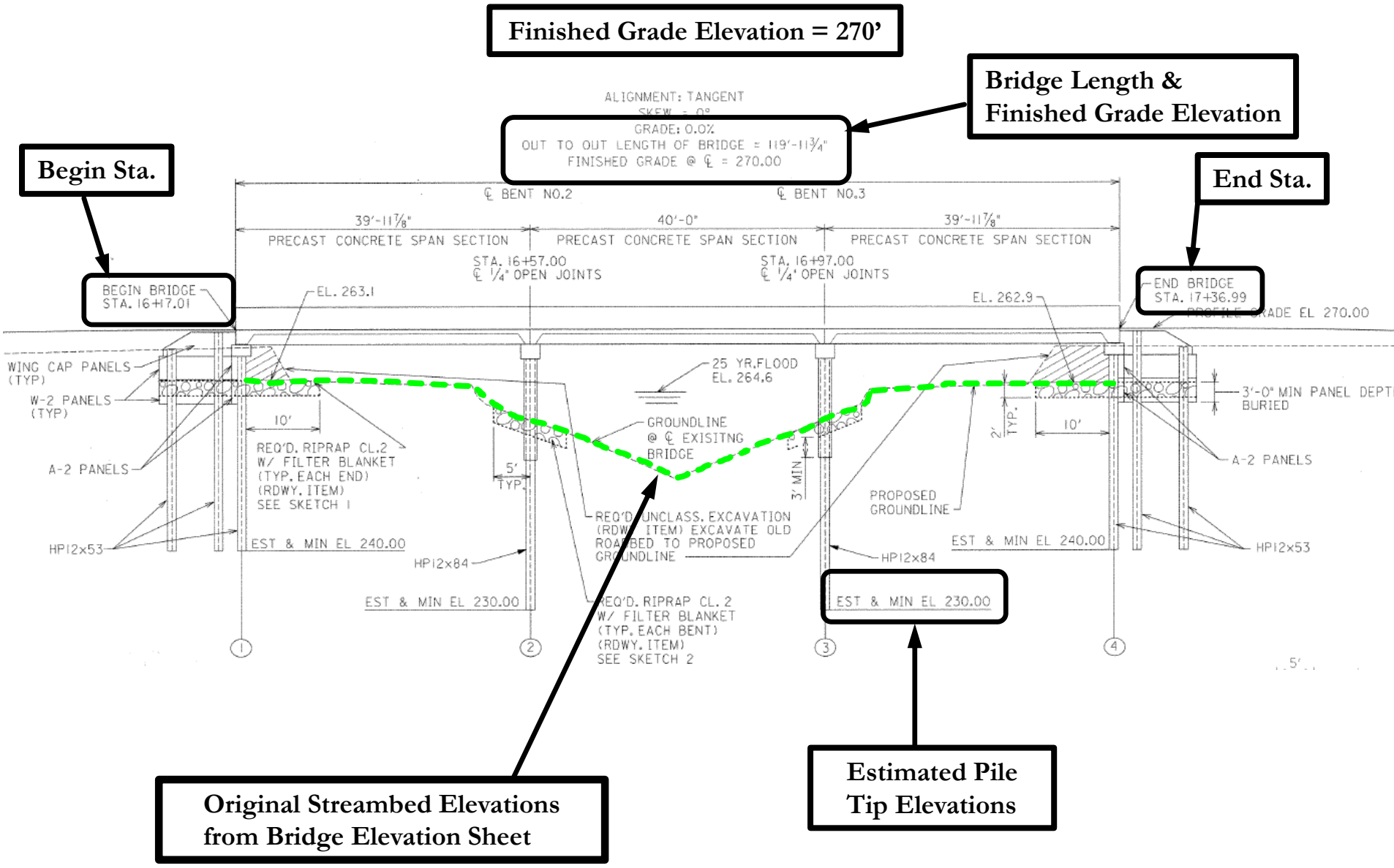
LAMAR COUNTY

GENERAL ELEVATION

BIN: 20669

ESTIMATED QUANTITIES: DESIGNED BY: DSH DRAWN BY: DRT
COMPUTED BY: DRT CHECKED BY: DATE DRAWN:
VERIFIED BY: DSH DATE CHECKED: SCALE:

Bridge Elevation Detail



Hydraulic Data & Standard Drawing Info

HYDRAULIC DATA

RECURRENCE INTERVAL (YR.)	DISCHARGE (CFS)	WATER SURFACE ELEVATION (FT.)
25	2985	264.6
50	3585	264.9
100	4235	265.3
200	4950	265.7
500	6045	266.1

DRAINAGE AREA FOR BRIDGE = 14.5 SQ. MILES

V25 = 4.7 FT./SEC.

OPENING PROVIDED = 920 SQ. FT.

The data in the Estimate of Quantities, Required, and Special Notes areas gives information related to the size of piling, quantities used, cap size, span arrangements, railing, wings, and panel information. It also lists all Standard Drawings used in the project and any special notes that may be needed during construction.

SPECIAL NOTES

1) PILE ENCASEMENTS SHALL EXTEND A MINIMUM OF 3 FEET BELOW BOTTOM OF RIPRAP. PILE ENCASEMENTS SHALL EXTEND TO BOTTOM OF CAP.
2) THE FURNISHING OF ALL NECESSARY EQUIPMENT AND THE CONSTRUCTION OF ALL SHEETING AND SHORING, CRIBS, COFFERDAMS, CAISSONS, DEWATERING, ETC. WHICH MAY BE NECESSARY FOR THE CONSTRUCTION OF PILE ENCASEMENTS SHALL BE A SUBSIDIARY OBLIGATION OF 510A, BRIDGE SUBSTRUCTURE CONCRETE.
3) NO SUBSTITUTIONS OF ALTERNATE SPAN ARRANGEMENTS SHALL BE ALLOWED.
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ESTIMATE OF QUANTITIES

QUANTITY	ITEM	UNIT	DESCRIPTION
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1	505B	EACH	STATIC LOADING TESTS (HP 12X53)
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786	505M	LINEAR FOOT	STEEL PILING FURNISHED AND DRIVEN (HP 12X53)
418	505M	LINEAR FOOT	STEEL PILING FURNISHED AND DRIVEN (HP 12X84)
2	507A	EACH	WIRE ROPE ABUTMENT ANCHOR ASSEMBLY
16	510A	CUBIC YARD	BRIDGE SUBSTRUCTURE CONCRETE, CLASS A
40	511A	EACH	ELASTOMERIC BEARING TYPE I
2	512A	EACH	PRECAST CONCRETE ABUTMENT CAPS, 2'-0" WIDE BY 1'-7" DEEP BY 28'-0" LONG
2	512B	EACH	PRECAST CONCRETE INTERMEDIATE BENT CAPS, 2'-0" WIDE BY 1'-7" DEEP BY 27'-6" LONG
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6	512C	EACH	PRECAST CONCRETE TYPE 2C SPAN SECTION, 3'-6" BY 2'-0" DEEP BY 39'-11 3/4" LONG
2	512D	EACH	PRECAST CONCRETE BARRIER RAIL INTERMEDIATE SECTION, 39'-11" LONG
4	512D	EACH	PRECAST CONCRETE BARRIER RAIL END SECTION, 39'-11 3/8" LONG
16	512E	EACH	PRECAST CONCRETE ABUTMENT PANELS, TYPE A2, 6'-1" LONG
8	512F	EACH	PRECAST CONCRETE WING PANELS, TYPE W2
4	512G	EACH	PRECAST CONCRETE ABUTMENT WING CAP PANELS

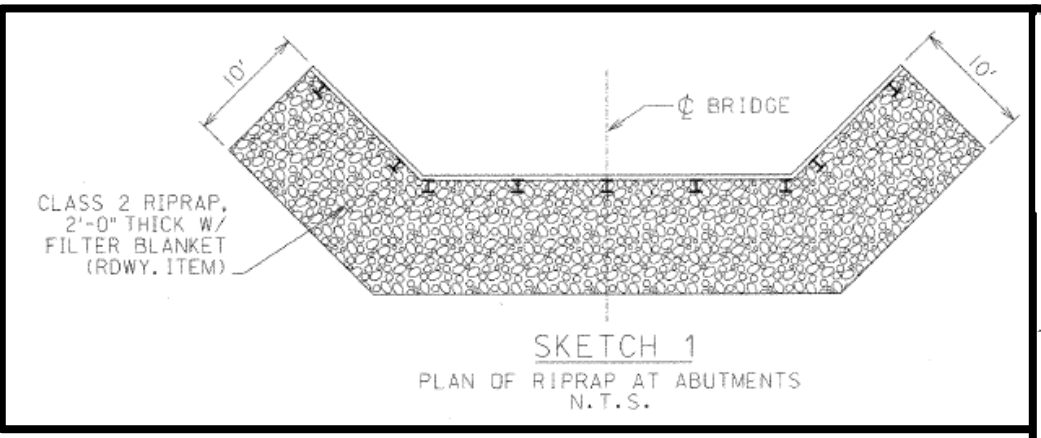
REQUIRED

3--	40' PRECAST CONCRETE SPANS W/ BARRIER RAIL	BRIDGE SHEET NO. 1 AND STANDARD DRAWING NO. PC-40
	PRECAST CONCRETE BARRIER RAIL	BRIDGE SHEET NO. 1 AND STANDARD DRAWING NO. PCBR-1(40)
2--	PRECAST CONCRETE ABUTMENT CAPS WITH STEEL PILES	BRIDGE SHEET NO. 1 AND STANDARD DRAWING NO. PCA-2440
2--	PRECAST CONCRETE BENT CAPS WITH STEEL PILES	BRIDGE SHEET NO. 1 AND STANDARD DRAWING NO. PCB-2440
	PRECAST CONCRETE ABUTMENT PANELS	BRIDGE SHEET NO. 1 AND STANDARD DRAWING NO. PCP-2400
	TEST BORINGS	BRIDGE SHEET NO. 2
	BRIDGE GENERAL NOTES	STANDARD DRAWING BGN-1
	STANDARD FOR STANDARD DETAILS	STANDARD DRAWING I-131

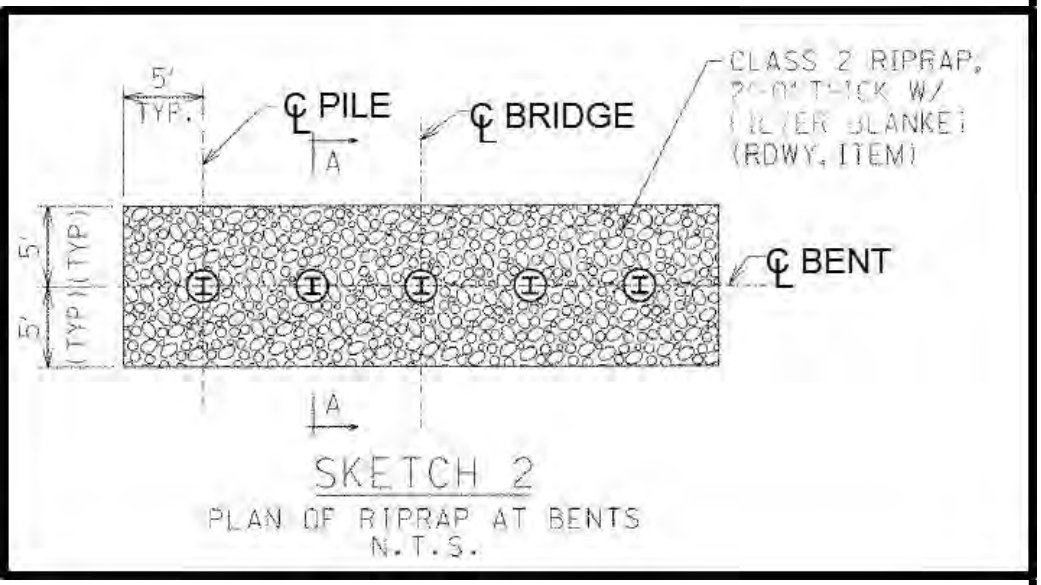
The Hydraulic Data states the Drainage Area, Velocities, and the Opening Provided for the bridge. It also list the Recurrence Intervals with the Discharge and Water Surface Elevation associated with each event.

This Information has been taken from the General Elevation Bridge Sheet.

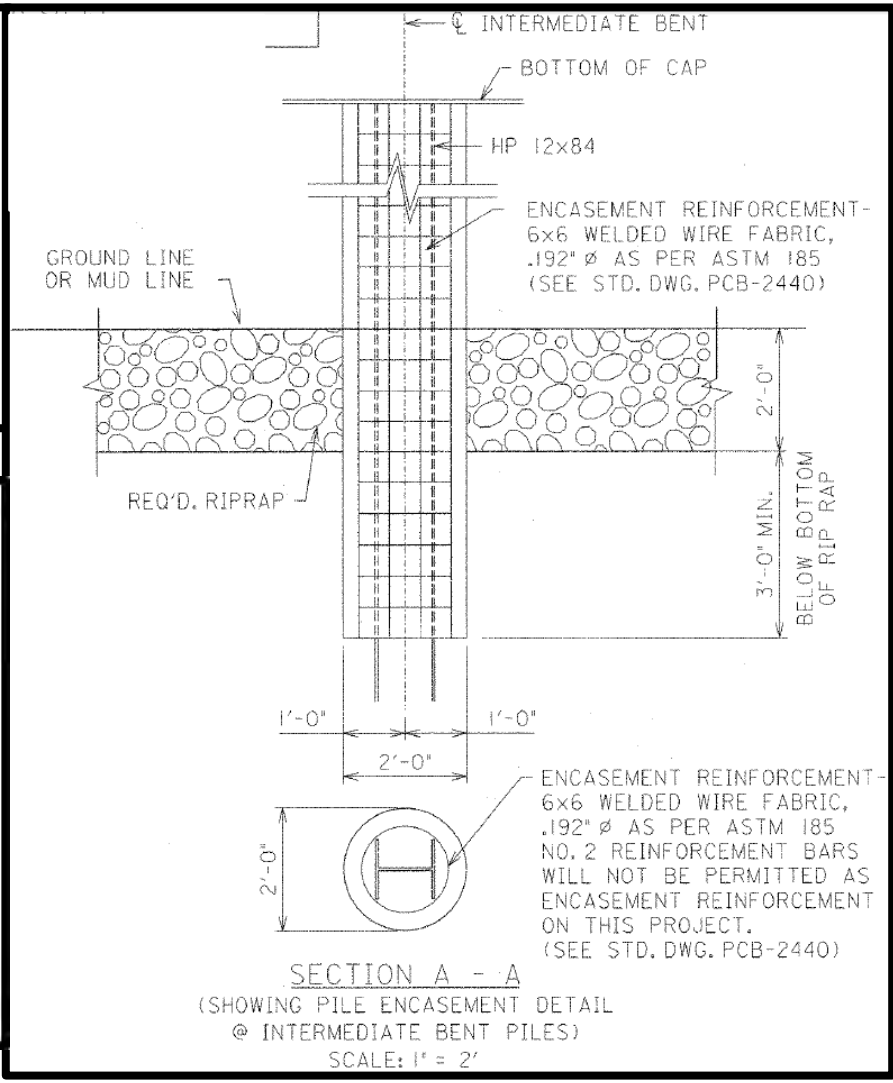
Pile & Riprap Details



SKETCH 1
PLAN OF RIPRAP AT ABUTMENTS
N.T.S.



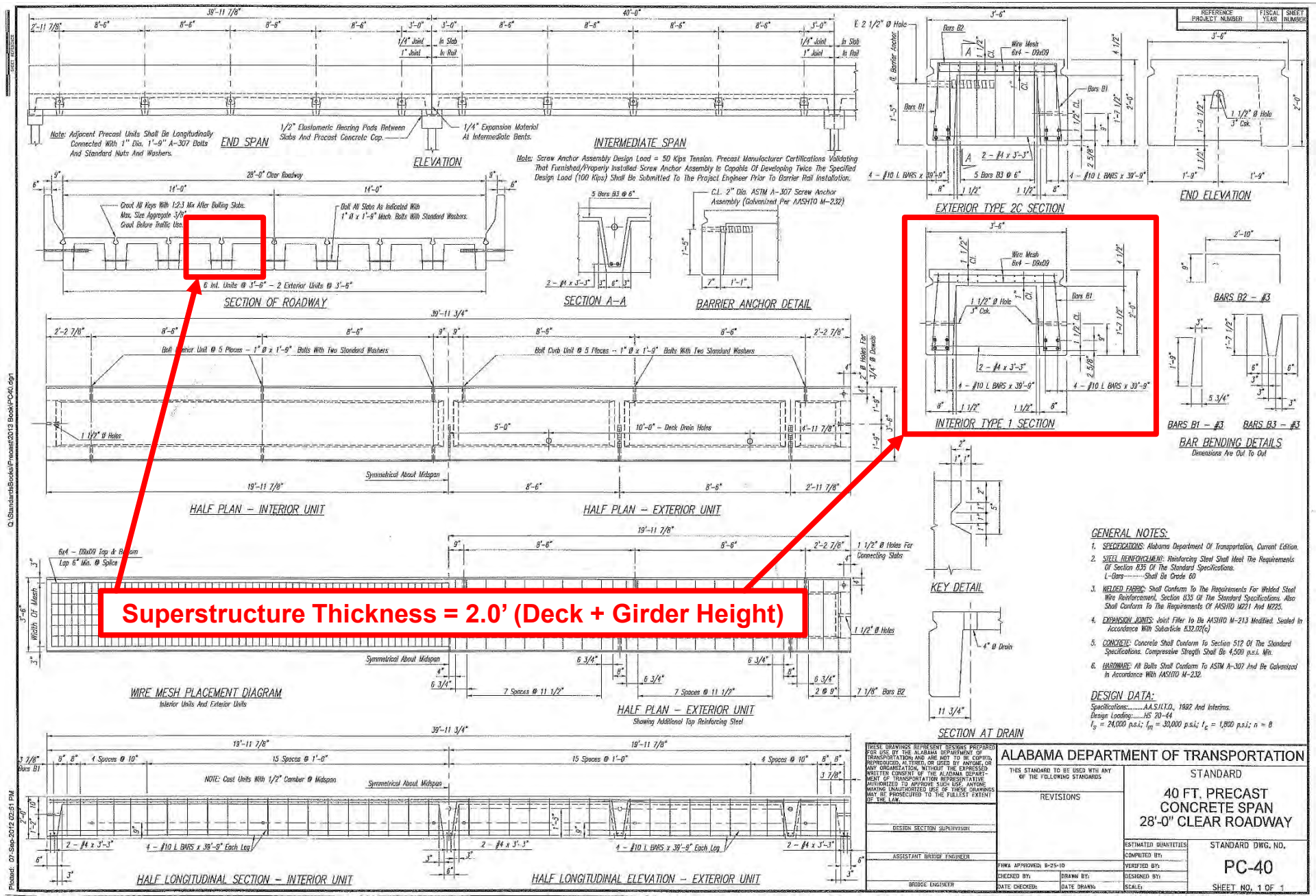
SKETCH 2
PLAN OF RIPRAP AT BENTS
N.T.S.



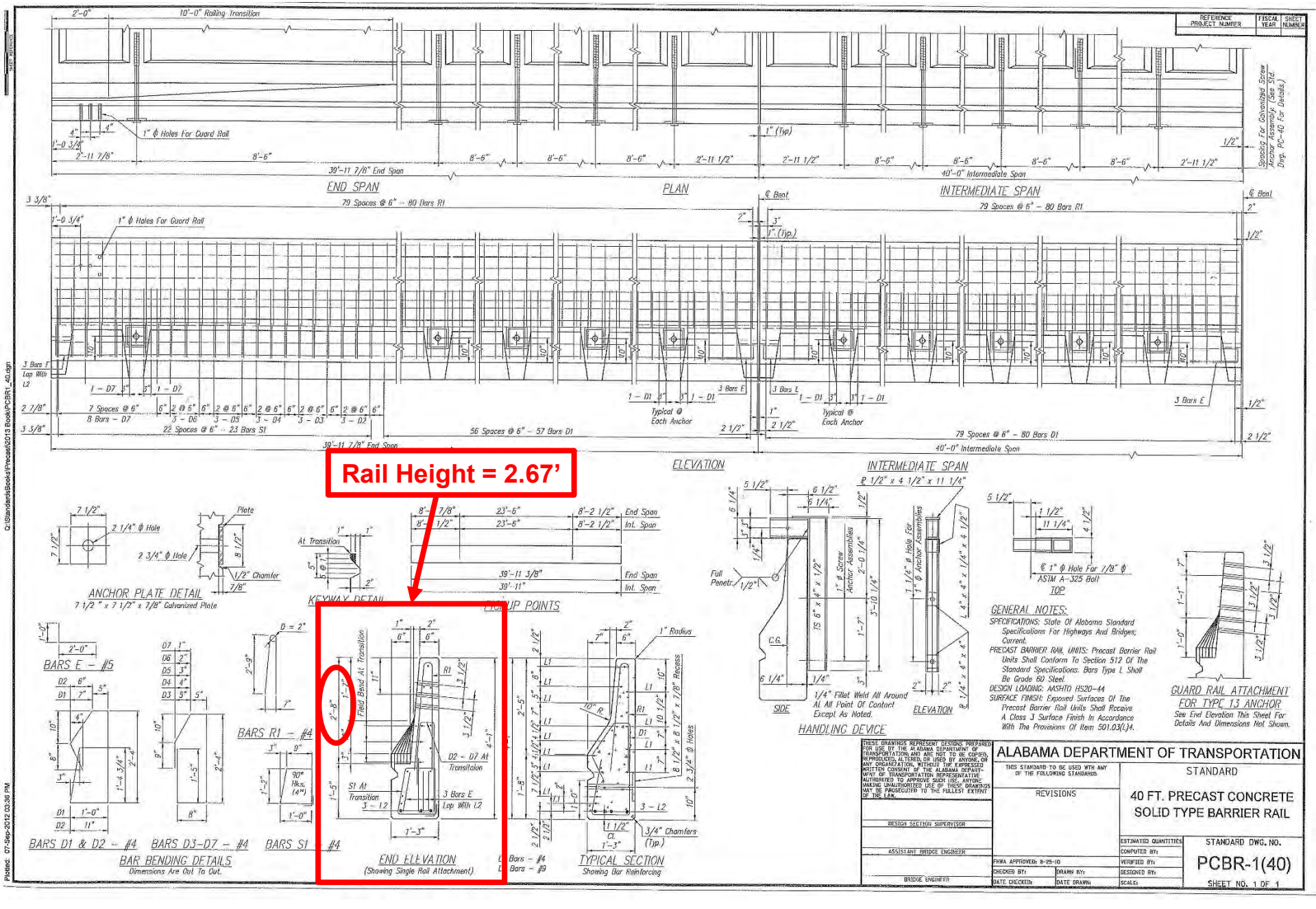
SECTION A - A
(SHOWING PILE ENCASEMENT DETAIL @ INTERMEDIATE BENT PILES)
SCALE: 1" = 2'

This Information has been taken from the General Elevation Bridge Sheet.

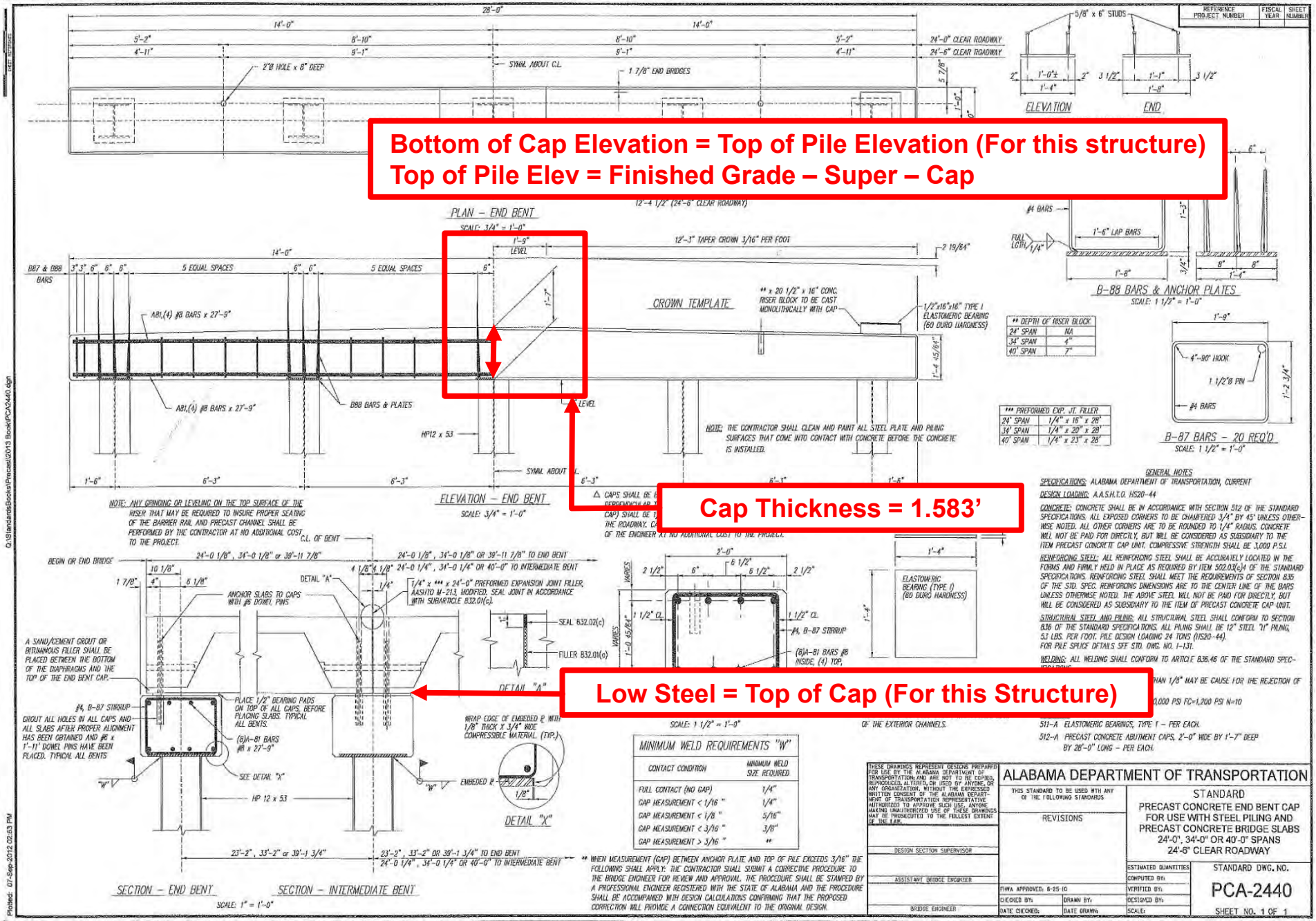
Precast Concrete Spans



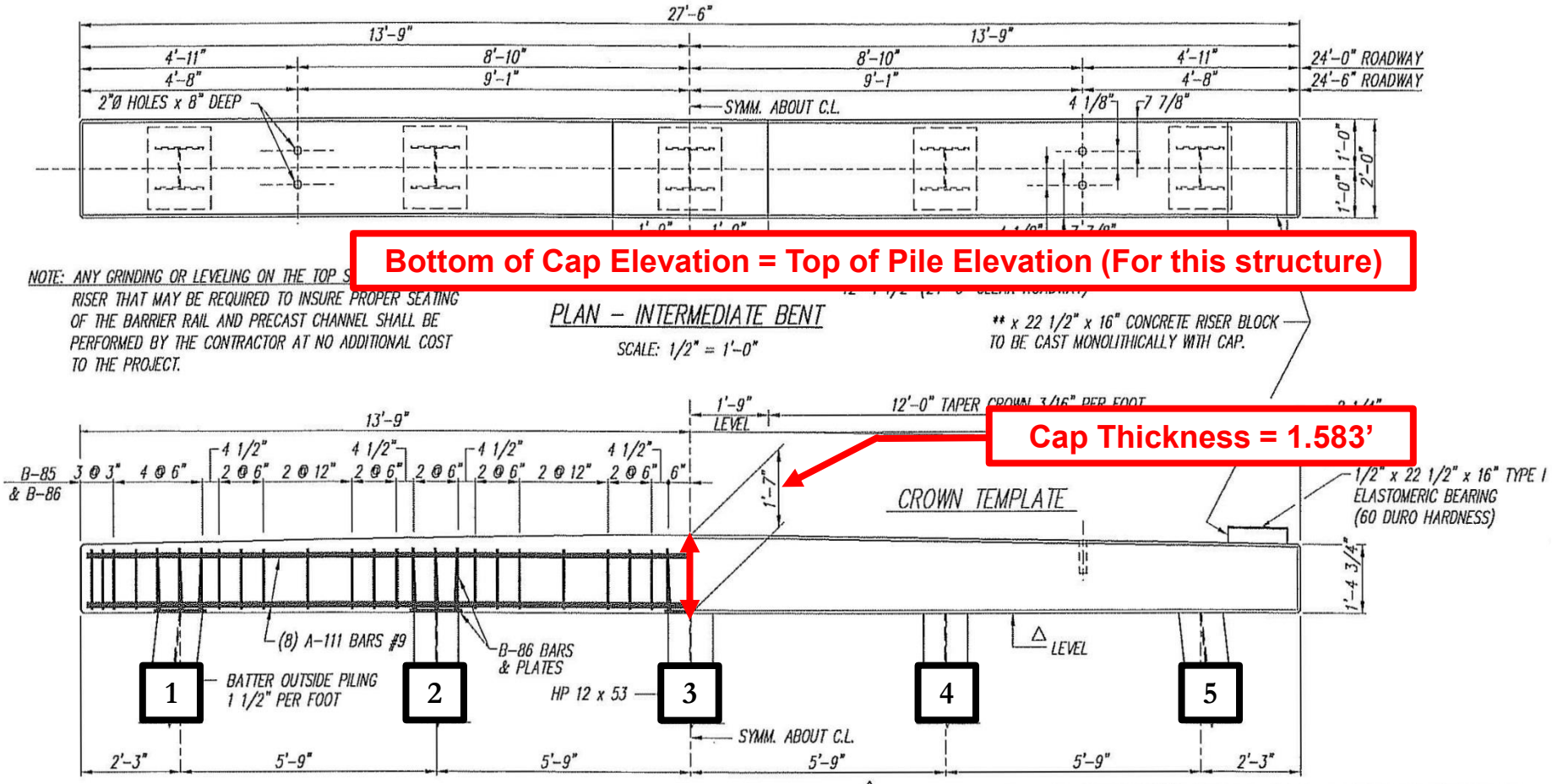
Precast Concrete Barrier Rail



Precast Concrete Abutments



Precast Concrete Bent Caps



ELEVATION – INTERMEDIATE BENT

SCALE: 1/2" = 1'-0"

△ CAPS SHALL BE ERECTED SO THAT THE BOTTOM OF THE CAP IS LEVEL ALONG THE ROADWAY AND PERPENDICULAR TO THE ROADWAY. THE ACCEPTABLE ERECTION TOLERANCE (SLOPE ON BOTTOM OF CAP) SHALL BE 1/16" PER FOOT ALONG THE ROADWAY AND 1/16" PER FOOT PERPENDICULAR TO THE ROADWAY. CAPS ERECTED OUTSIDE THIS TOLERANCE SHALL BE CORRECTED TO THE SATISFACTION OF THE ENGINEER AT NO ADDITIONAL COST TO THE PROJECT.

5 Piles @ Each Intermediate Bent

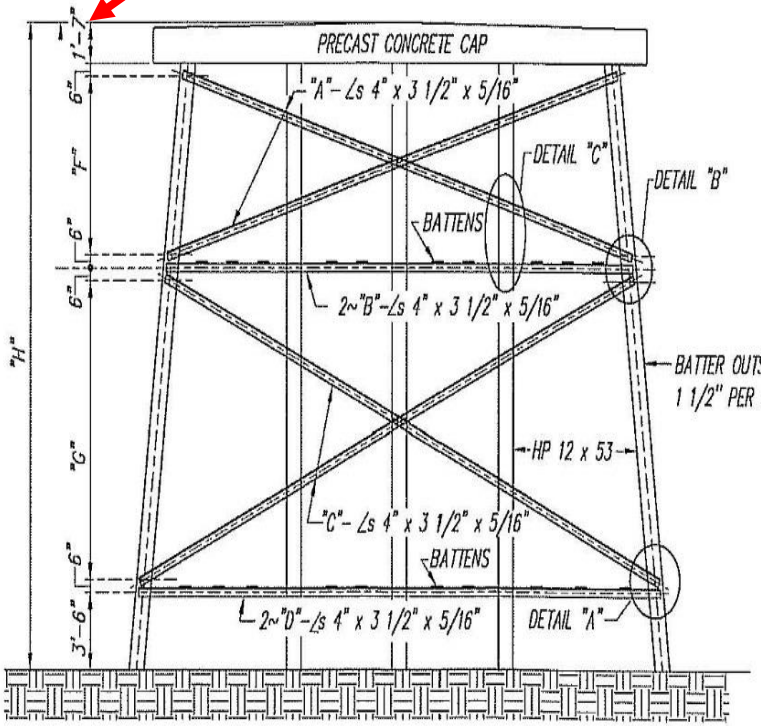
STANDARD DWG. NO.

PCB-2440

Precast Concrete Bent Caps

Bottom of Cap Elevation = Top of Pile Elevation (For this structure)

Cap Thickness = 1.583’

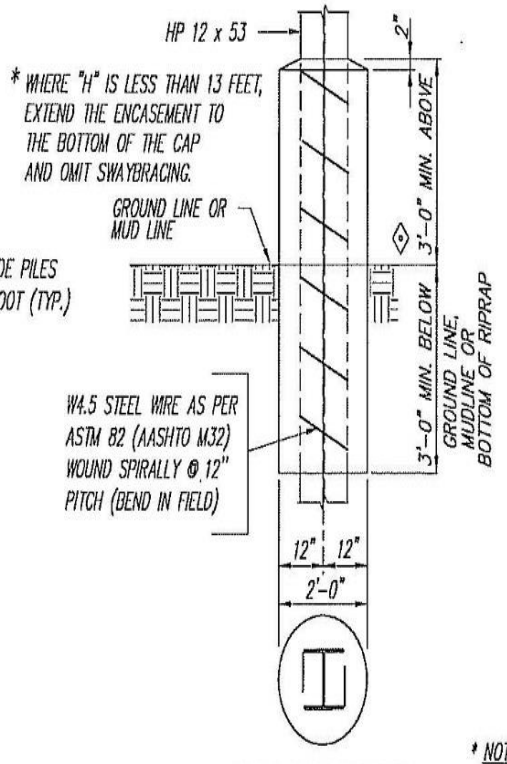


SWAYBRACING DETAILS

N.T.S.

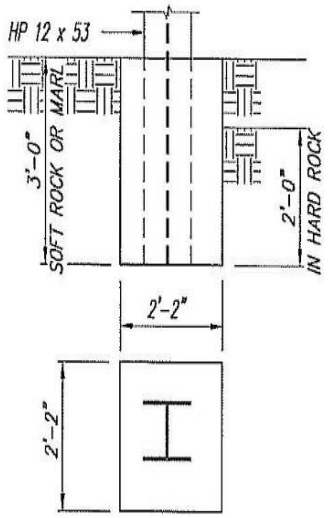
TWO STORY BENT SHOWN, SINGLE STORY BENTS SIMILAR. SWAYBRACING FOR SINGLE STORY BENTS SHALL BE 4" x 3 1/2" x 5/16" ANGLES & DESIGNATED BY THE LETTER "A" AND "B". ALL PILING AT GROUND AND OR WATER LINE SHALL BE ENCASED IN CONCRETE. NOTE ENCASEMENT DETAILS.

◇ WHERE PILE BENT IS LOCATED IN WATER, ENCASEMENT SHALL EXTEND 3'-0" MIN. ABOVE NORMAL WATER LINE AS DETERMINED BY ENGINEER.



PILE ENCASEMENT DETAILS

SCALE: 1/2" = 1'-0"



NOTE: WHERE SUFFICIENT PILE PENETRATION CANNOT BE OBTAINED, PILES SHALL BE ENCASED WITH CONCRETE PEDESTALS AS SHOWN. COST OF THE CONCRETE PEDESTALS TO BE PAID FOR IN ACCORDANCE WITH SUBARTICLE 505.05(f) OF THE STANDARD SPECIFICATIONS. APPROVAL FOR USE MUST BE OBTAINED FROM THE BUREAU OF CONSTRUCTION.

DETAILS FOR PILING ON CONCRETE PEDESTAL FOUNDATION

SCALE: 1/2" = 1'-0"

* NOTE: PILE ENCASEMENT MAY BE STOPPED 1'-0" BELOW THE BOTTOM OF CAP. THE CONTRACTOR SHALL CLEAN AND PAINT THE STEEL PLATE AND THE PILING FROM THE BOTTOM OF THE CAP TO 12" BELOW THE TOP OF THE PILE ENCASEMENTS AS PER SPECIFICATIONS. TOP OF ENCASEMENT SHALL BE SLOPED TO DRAIN. FOR ALTERNATE PAINT DETAILS, SEE STD. DWG. NO. 1-131.

5 Piles @ Each Intermediate Bent

STANDARD DWG. NO.

PCB-2440

Steel Pile Records - Abutments

To Determine Pile Tip Elevations for This Structure:

1st Determine the Low Steel Elevation

Low Steel Elevation =
Finished Grade – Superstructure Thickness

Low Steel Elevation = 270.0 – 2.0 = 268.0

2nd Determine the Top of Pile Elevation

Top of Pile Elevation =
Low Steel Elevation – Cap Distance to Top of Pile

Top of Pile Elevation = 268.0 – 1.583 = 266.42

3rd Determine Pile Tip Elevations

Pile Tip Elevation =
Top of Pile Elevation – Shortest Pile Length for each Support

Abutment #1 = 266.42 – 27.4 = 239.02
Abutment #4 = 266.42 – 31.65 = 234.77

FORM C-16S
Created 05-21-01

ALABAMA DEPARTMENT OF TRANSPORTATION
DRIVING RECORD OF STEEL PILING

Project Number	County	Division
BRZ-3800(213)	LAMAR	WEST CENTRAL REGION

Bridge: Station	to Station	Bridge Identification Number
16 + 17.00	17 + 36.98	20669

Road Between	and
PLEASANT RIDGE ROAD	SOUTH MORRIS ROAD

Contractor	Sub-Contractor
GLASGOW CONSTRUCTION	

Size of Piling: HP 12 X 53

Hammer Make	Hammer Model	Hammer Kind	Average Finished Groundline Elevation of Structure
ICE	I-19	DIESEL	261.4

Hammer Type (Open or Closed)	Hammer Action	Design Load (from plans)
Open	SINGLE	24 TONS

Actual Length in Structure

Date	Bent No.	Pile No.	Proposed Length (feet) (m)	Furn. Length (feet) (m)	Added Pile (feet) (m)	Pile Heat No.	Actual Length Cutoff (feet) (m)	Actual Length in Str. (feet) (m)	Total Splices	Height of Fall (feet) (m)	Energy Delivered (ft.-lbs.) (J)	Blows per foot (0.3 m) of Penet.	Tip Elev.	Bearing (tons) (kN)
01/06/15	1	1		40		314485	7.85	32.15	0	7.9	31,671	240		
01/06/15	1	2		40		317130	12.6	27.4	0	7.9	31,671	240		
01/06/15	1	3		40		317130	4.5	35.5	0	7.9	31,671	240		
01/06/15	1	4		40		317130	9.4	30.6	0	7.9	31,671	240		
01/06/15	1	5		40		317130	8.35	31.65	0	7.9	31,671	240		
12/30/14	4	1		40	0	317126	7.6	32.4	0	7.9	31,671			
12/30/14	4	2		40	0	317126	6.15	33.85	0	7.9	31,671			
12/30/14	4	3		40	0	317126	5.8	34.2	0	7.9	31,671			
12/30/14	4	4		40	0	317130	4.3	35.7	0	7.9	31,671			
12/30/14	4	5		40	0	317130	8.35	31.65	0	7.9	31,671			

Always select the Shortest Pile that will Produce the Highest Pile Tip Elevation for each support.

Steel Pile Records – Intermediate Bents

To Determine Pile Tip Elevations for This Structure:

1st Determine the Low Steel Elevation

Low Steel Elevation =
Finished Grade – Superstructure Thickness

Low Steel Elevation = 270.0 – 2.0 = 268.0

2nd Determine the Top of Pile Elevation

Top of Pile Elevation =
Low Steel Elevation – Cap Distance to Top of Pile

Top of Pile Elevation = 268.0 – 1.583 = 266.42

3rd Determine Pile Tip Elevations

Pile Tip Elevation =
Top of Pile Elevation – Shortest Pile Length for each Support

Bent #2 = 266.42 – 38.7 = 227.72
Bent #3 = 266.42 – 40.2 = 226.22

FORM C-16S
Created 05-21-01

ALABAMA DEPARTMENT OF TRANSPORTATION
DRIVING RECORD OF STEEL PILING

Project Number	County	Division
BRZ-3800(213)	LAMAR	WEST CENTRAL REGION

Bridge: Station	to Station	Bridge Identification Number
16 + 17.00	17 + 36.98	20669

Road Between	and
PLEASANT RIDGE ROAD	SOUTH MORRIS ROAD

Contractor	Sub-Contractor
GLASGOW CONSTRUCTION	

Size of Piling: HP 12 X 84

Hammer Make	Hammer Model	Hammer Kind	Average Finished Groundline Elevation of Structure
ICE	I-19	DIESEL	257.2

Hammer Type (Open or Closed)	Hammer Action	Design Load (from plans)
Open	SINGLE	40 TONS

Actual Length in Structure

Date	Bent No.	Pile No.	Proposed Length (feet) {m}	Furn. Length (feet) {m}	Added Pile (feet) {m}	Pile Heat No.	Actual Length Cutoff (feet) {m}	Actual Length in Str. (feet) {m}	Total Splices	Height of Fall (feet) {m}	Energy Delivered (ft.-lbs.) {J}	Blows per foot {0.3 m} of Penet.	Tip Elev.	Bearing (tons) {kN}
12/10/14	2	1		45		305602	6.3	38.7	0	7.9	23,970	240		
12/10/14	2	2		45		305602	2.13	42.87	0	7.9	23,970	240		
12/10/14	2	3		45		305602	3.77	41.23	0	7.9	23,970	240		
12/10/14	2	4		45		302484	4.18	40.82	0	7.9	23,970	240		
12/10/14	2	5		45		305602	2.66	42.34	0	7.9	23,970	240		
12/05/14	3	1		45		314346	4.8	40.2	0	7.9	23,970	240		
12/05/14	3	2		45		314346	3.79	41.21	0	7.9	23,970	240		
12/05/14	3	3		45		314346	0.29	44.71	0	7.9	23,970	240		
12/05/14	3	4		45		314346	2.86	42.14	0	7.9	23,970	240		
12/05/14	3	5		45		311206	1.53	43.47	0	7.9	23,970	240		

Always select the Shortest Pile that will Produce the Highest Pile Tip Elevation for each support.

Culvert Structure Detail Options

Options For Entering Structure Data Into BrM To Obtain Graphs of Culvert/Drainage Structures

Note: Keep in mind that we are manipulating the available data input in BrM to produce a representative graph of a culvert/drainage structure.

BrM Structure Detail Pane - Data Input

Reference Curb/Rail

- Can be any location (not limited to the following)
  - Top of barrier rail
  - Top of parapet wall
  - Top of flowline, toe wall or apron

Deck Elevation

- Required for all structures
- Does not have to be the actual deck (finished grade) elevation
- Essential for BrM to draw the Superstructure Thickness

Support Designation and Elevations

- Reinforced Concrete Box Culverts are classified as large spread footings
- Piles placed at prescribed elevations can aid in the creation of the graphs
- Culverts should NOT be entered as having Unknown Foundation elevations
- Spread Footings can be used for bottomless culverts with footings

Superstructure Thickness

- Can depict any vertical component of a drainage structure opening
- The height/rise of the drainage structure opening

Options For Entering Structure Data Into BrM To Obtain Graphs of Culvert/Drainage Structures

Note: Keep in mind that we are manipulating the available data input in BrM to produce a representative graph of a culvert/drainage structure.

BrM Original Streambed Elevations Pane - Data Input

Original streambed elevations

- Not required for all culvert/drainage type structures
- Not limited to the original streambed location
- Used to locate the toe wall at culverts
- Can be placed at roadway elevation for shallow fill heights
- Causes plot distortions if used for roadway elevations on high fills

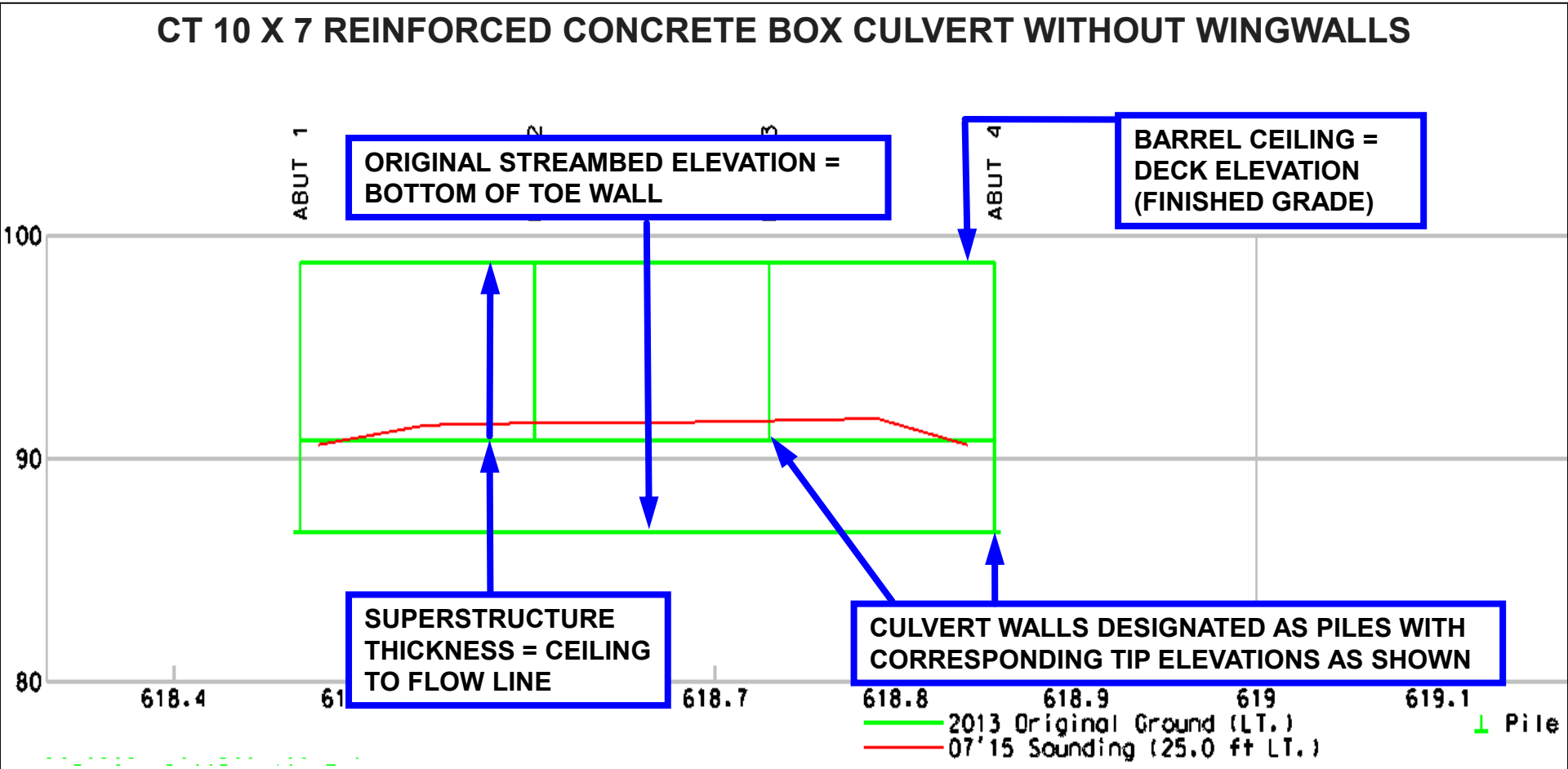
BrM Streambed Cross Sections Pane - Data Input

Sounding reference

- All soundings should be taken from a common reference point
- Location should be entered in the “Location Of BM” field
- Elevation & Location should match that on the Structure Detail

Culvert Example

Culvert Example



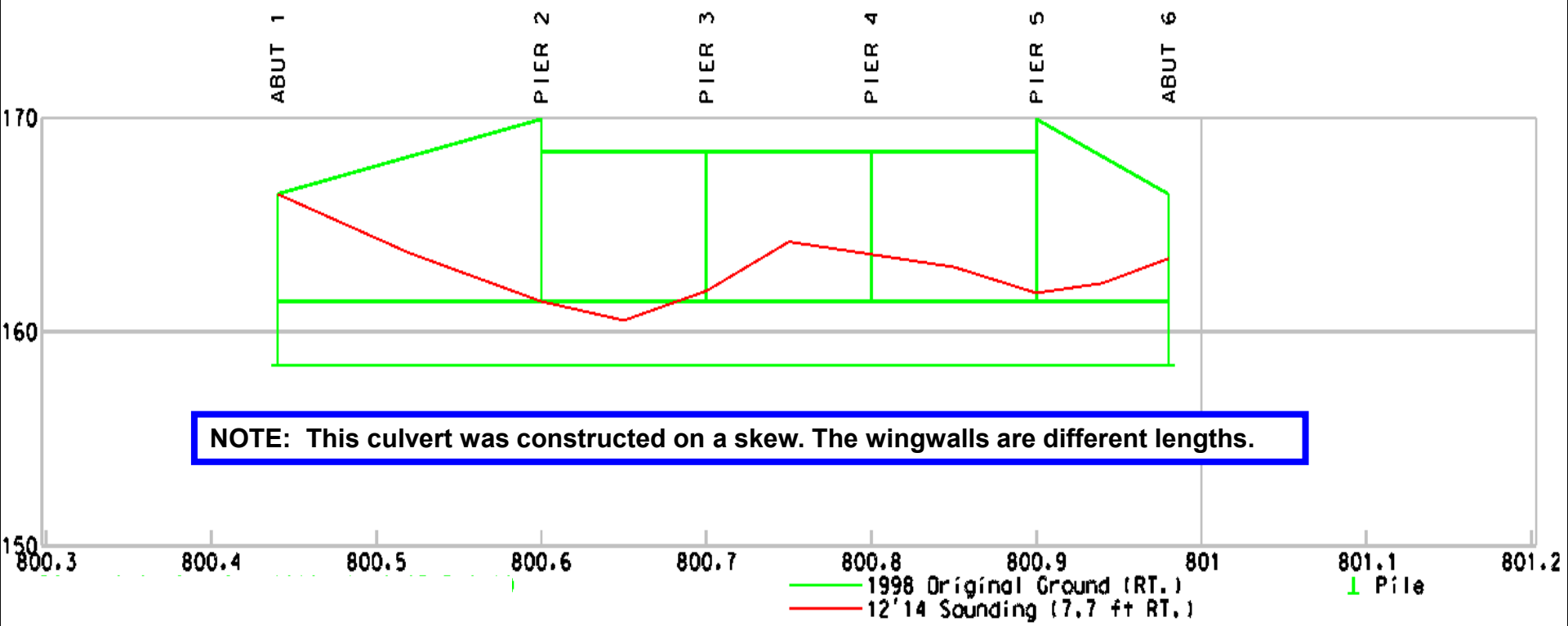
NOTE: This method is sufficient for culvert data entry into BrM.

NOTE: If the toe wall depth is unknown, the bridge inspector should probe at the culvert to determine the toe wall depth.

Culvert Example

CT 10 X 7 REINFORCED CONCRETE BOX CULVERT WITH WINGWALLS

NOTE: This is a similar culvert as the one on the previous page. The bridge inspector added wingwalls to the structure detail data. Soundings are taken along the wingwalls as well.



NOTE: This culvert was constructed on a skew. The wingwalls are different lengths.

Culvert Example

STRUCTURE DETAIL OBSERVATION

View Selection

View: Left view

Scour Items

Station EQ: 0 + 0.0000 = 800 + 52.000(

Station Direction: Increasing

Bent Direction: Increasing

Data Source: FIELD NOTES/BRIDGE CARI

Elev EQ: 0.00 = 0.00

Location of BM: UNKNOWN

Elev Basis: Assumption

Details

Add New Record

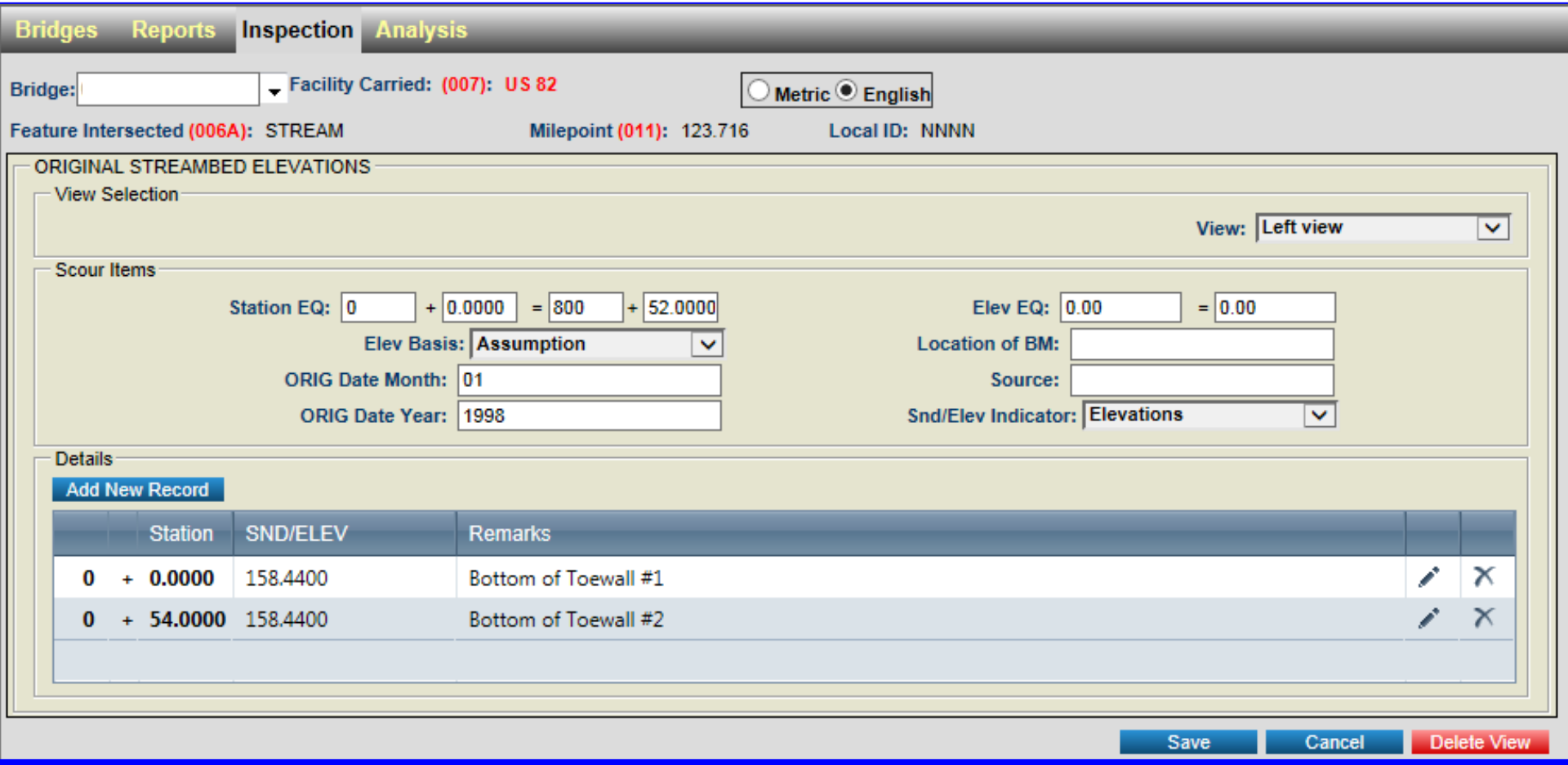
	Station	Ref Curb/Rail	Deck	Bot FTG	Pile Tip	FTG	Super Thick	Remarks		
0	+ 0.0000	166.4380	166.4380		158.4370	Pile Bent	5	TIP #1		
0	+ 4.0000	168.1880	168.1880			No Footing	6.7520	MID WING		
0	+ 7.9902	169.9380	169.9380			No Footing	8.5007			
0	+ 7.9951	168.4380	168.4380			No Footing	7.0013			
0	+ 8.0000	168.4380	168.4380		161.4370	Pile Bent	7.0013	WALL #1		
0	+ 18.0000	168.4380	168.4380		161.4370	Pile Bent	7.0013	WALL #2		
0	+ 28.0000	168.4380	168.4380		161.4370	Pile Bent	7.0013	WALL #3		
0	+ 38.0000	168.4380	168.4380		161.4370	Pile Bent	7.0013	WALL #4		
0	+ 38.0049	169.9380	169.9380			No Footing	8.5007			
0	+ 46.0000	168.1880	168.1880			No Footing	6.7520	MID WING		
0	+ 53.9951	166.4380	166.4380			No Footing	5			
0	+ 54.0000	168.4380	166.4380		158.4370	Pile Bent	5	TIP #2		

This is the input data for the Structure Detail Pane of the culvert example shown on the previous page. This example represents a culvert with wingwalls added to the Structure Detail Information. The following page is the data input on the Original Streambed Elevations Task. In this example, the Original Streambed is used to represent the Toe Wall of the Culvert.

Culvert Example

Input Data for the Original Streambed Elevations Pane

In this example, it represents the toe wall of the culvert.



NOTE: Original streambed elevation = bottom of toe wall. Information entered here shows the bottom of the toe wall extends from wing wall to wing wall

A Good Scour Inspection

NOTE: If the 'Toe Wall' depth at a culvert is 'Unknown', the bridge inspector should probe to determine the 'Toe Wall' depth. Knowing the depth of the 'Toe Wall' is necessary when monitoring the culvert for potential and existing scour.

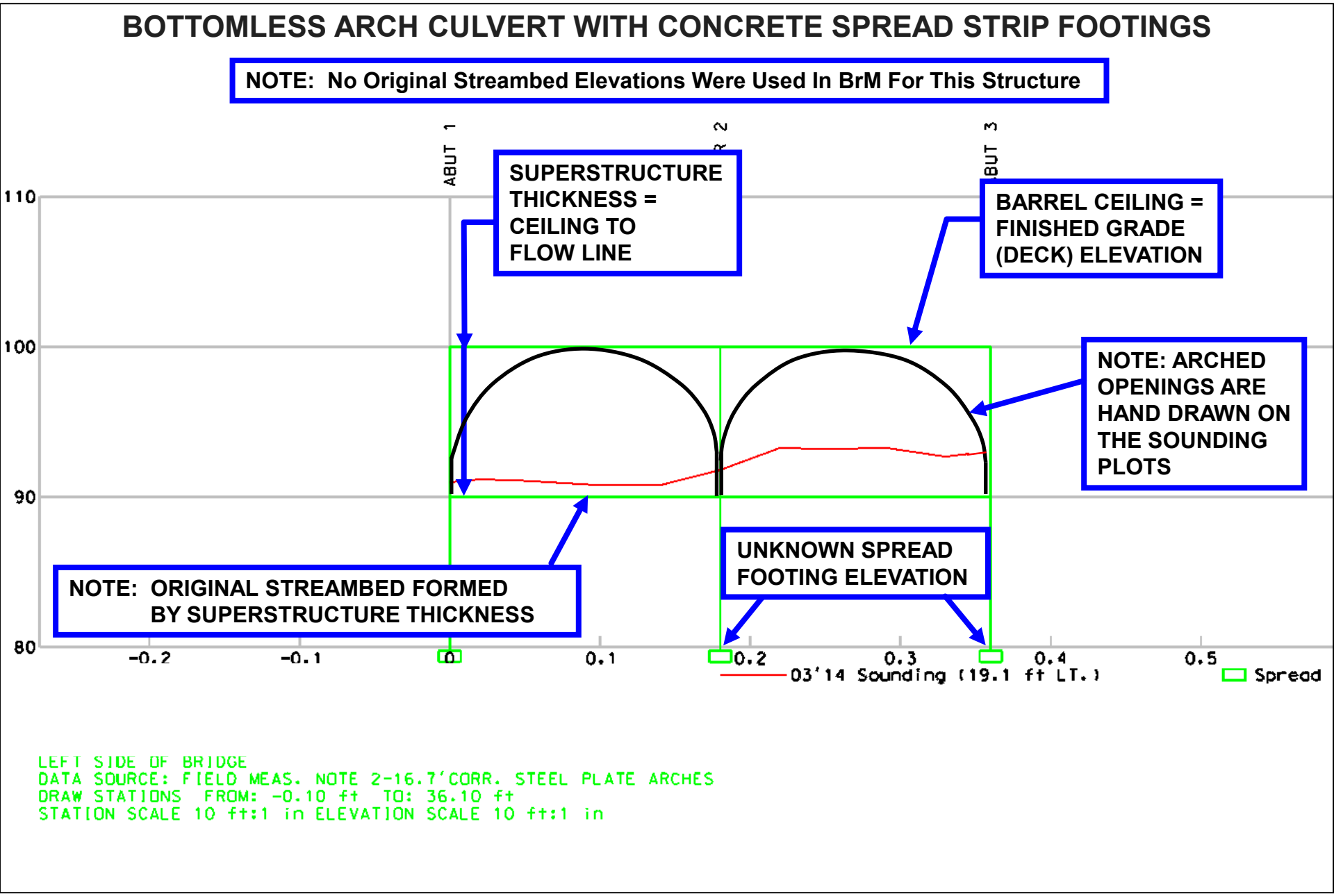
Culvert Scour Example

Culvert Scour Example

NOTE: Knowing where your 'Toe Wall' is may become helpful in preventing undermining via countermeasure placement.

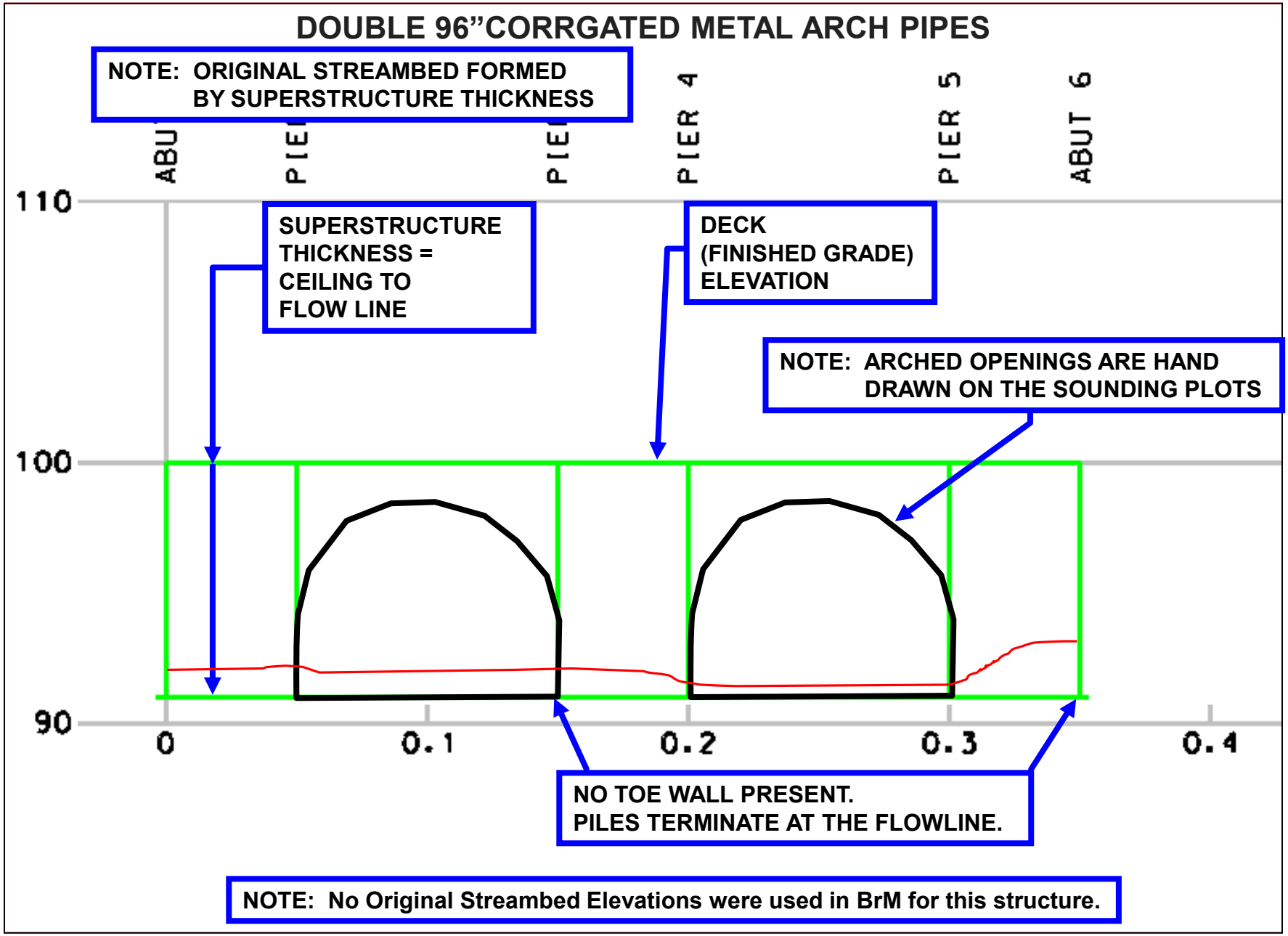
Bottomless Arch Culvert

Culvert Example



Double 96” Corrugated Metal Arch Pipes

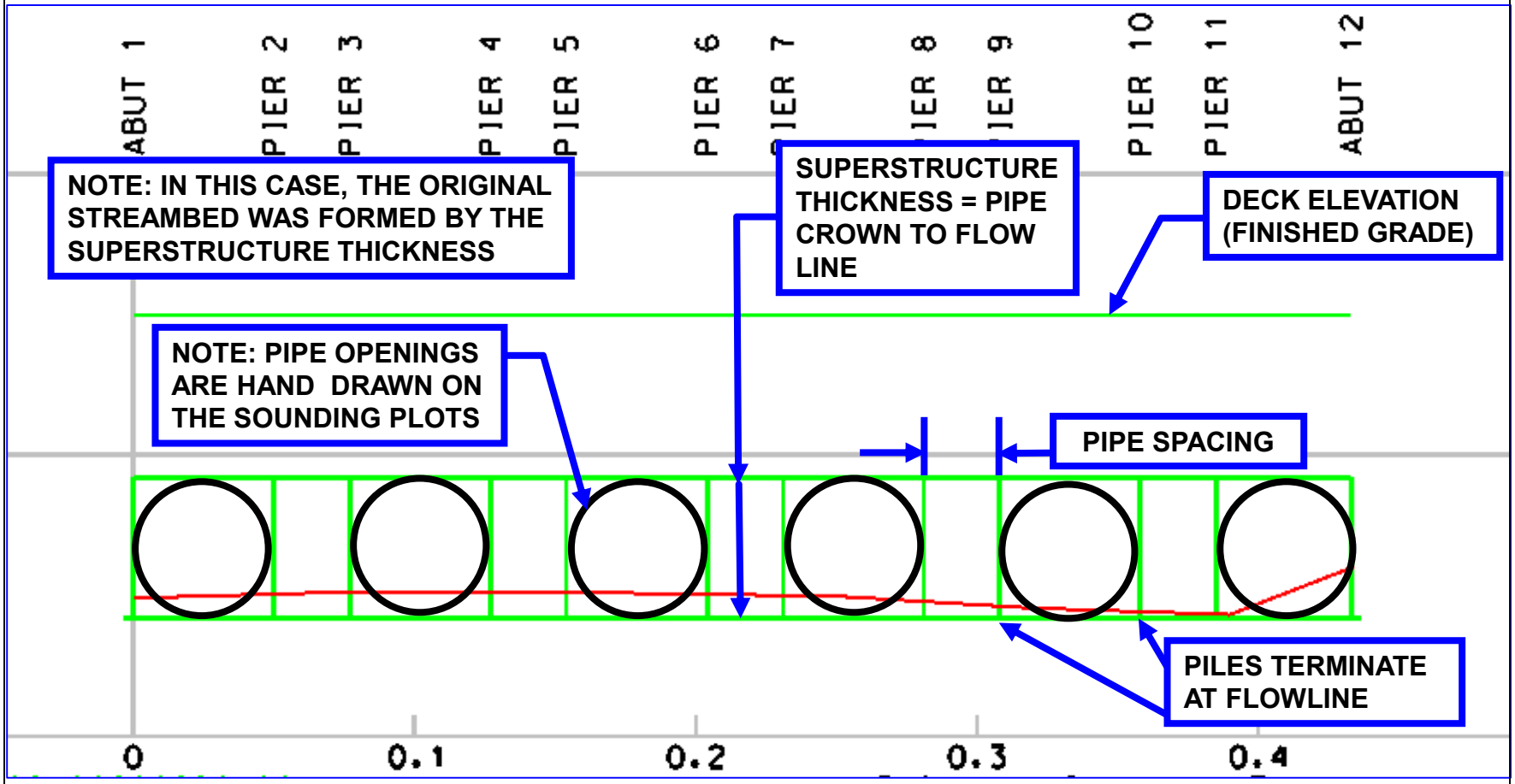
Culvert Example



Six 3’ Diameter Corrugated Metal Pipes

Culvert Example

SIX 3' DIAMETER CORRUGATED METAL PIPES



NOTE: Original Streambed Elevations were entered in BrM to show the location of the finished grade of the roadway. If there had been an appreciable difference in the original streambed & flow line at construction, this could be changed to show an actual original streambed.

AASHTOWare Bridge Management (BrM)

ALDOT Users - http://brm

All Users Outside ALDOT Firewall - http://brm.dot.state.al.us

The Bridge Management System can also be accessed by going to: ALDOT Intranet/Internet Home Page (www.dot.state.al.us) Select Maintenance from the Bureau drop-down menu, Click on the link for Bridge Inspection, then from the Bridge Inspection page, select the link for "ALDOT BrM Log On".

For any problems, contact the Bridge Management Section of the Maintenance Bureau @ (334) 242-6284 or the Bridge Scour Section @ (334) 242-6624.

Please feel free to contact the Bridge Scour Section with any questions or concerns.

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10/6/2017

Alabama Department of Transportation