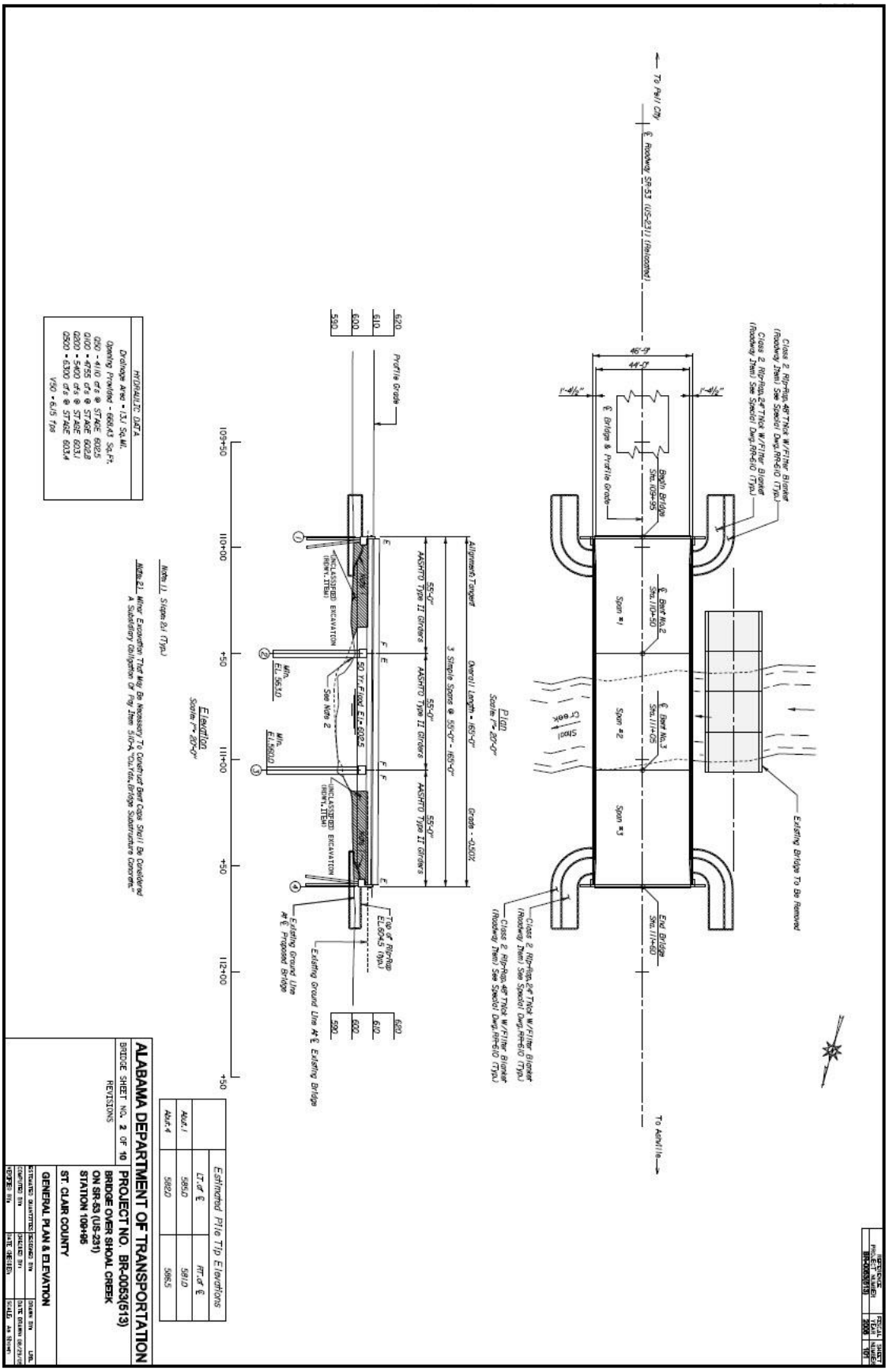
AASHTOWare BrDR 7.5.0

Substructure Tutorial

Frame Pier Drilled Shaft Example



Estimated Pile Tip Elevations	
Lt. of ℄	Rt. of ℄
589.0	589.0
589.0	586.5

Abut. 1
Abut. 4

ALABAMA DEPARTMENT OF TRANSPORTATION

PROJECT NO. BR-0053(513)

BRIDGE SHEET NO. 2 OF 10

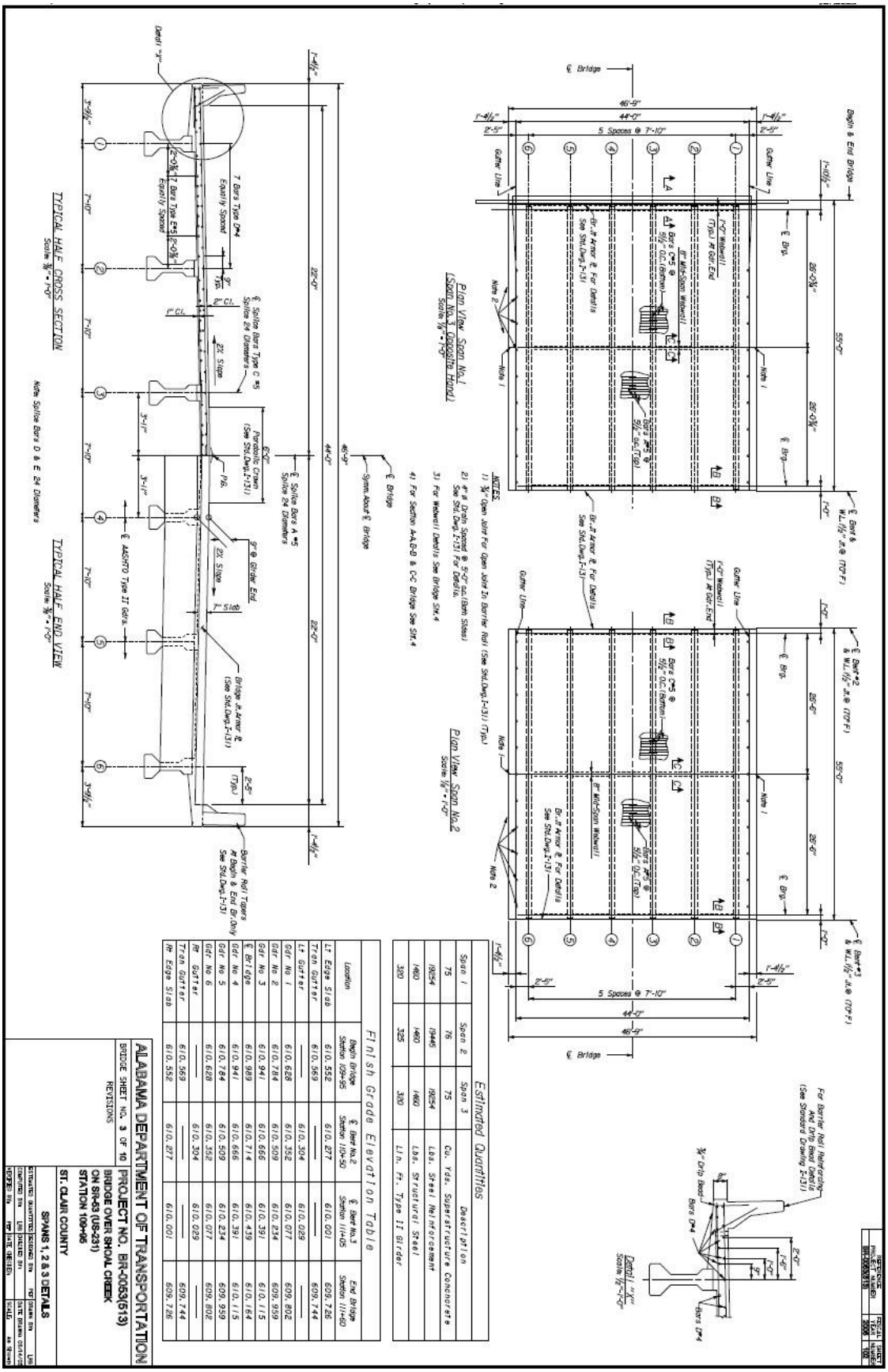
REVISIONS

BRIDGE OVER SHOAL CREEK
ON SR-53 (US-231)
STATION 109+95
ST. CLAIR COUNTY

GENERAL PLAN & ELEVATION

ESTIMATED QUANTITIES	DESIGNED BY	DRAWN BY	CHK'D
COMPUTED BY	CHECKED BY	DATE DRAWN 06/25/08	
KEYED BY	DATE CHECKED	SCALE As Shown	

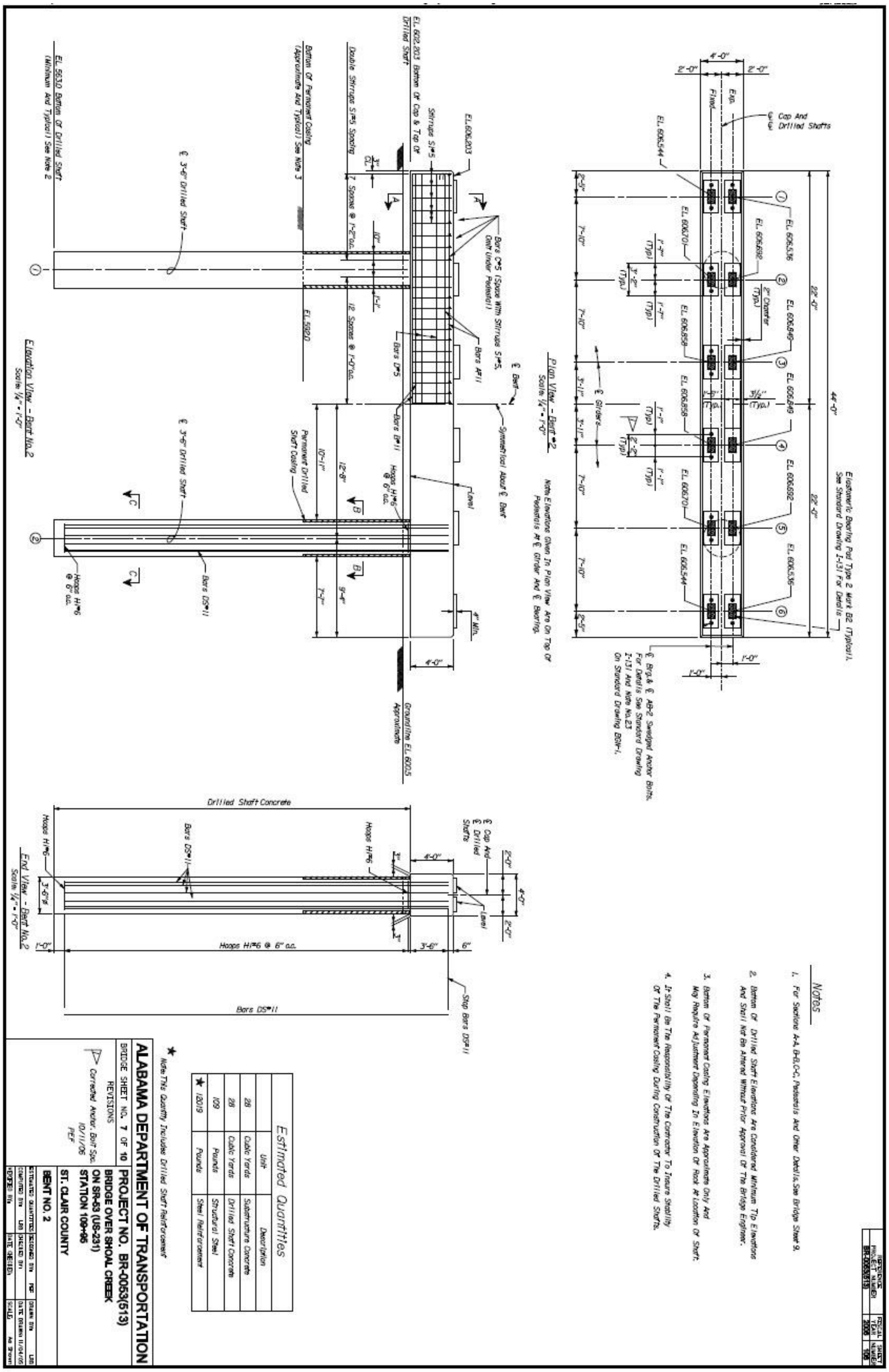
PROJECT NUMBER	FISCAL YEAR	SHEET NUMBER
BR-0053(513)	2008	101

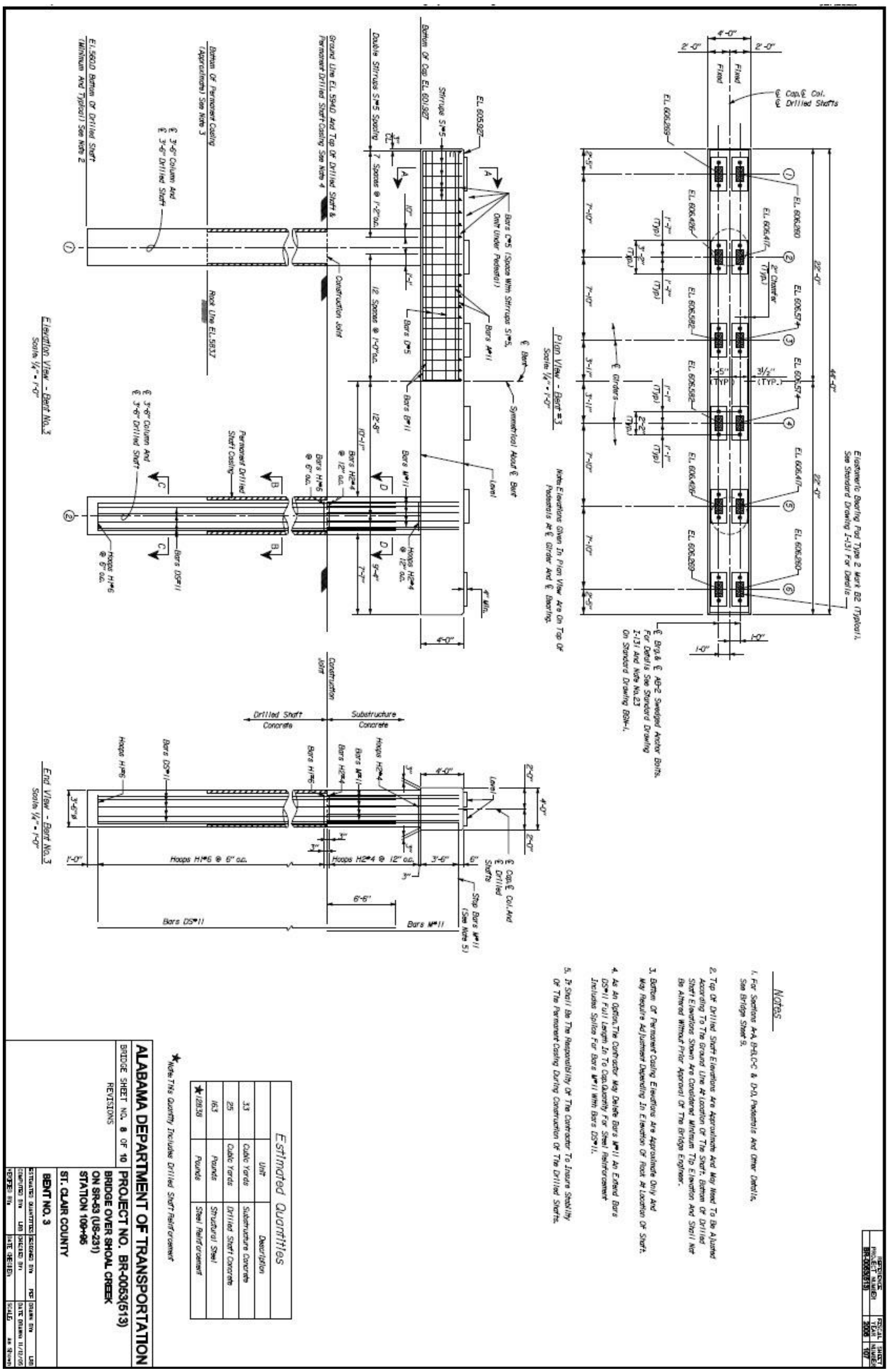


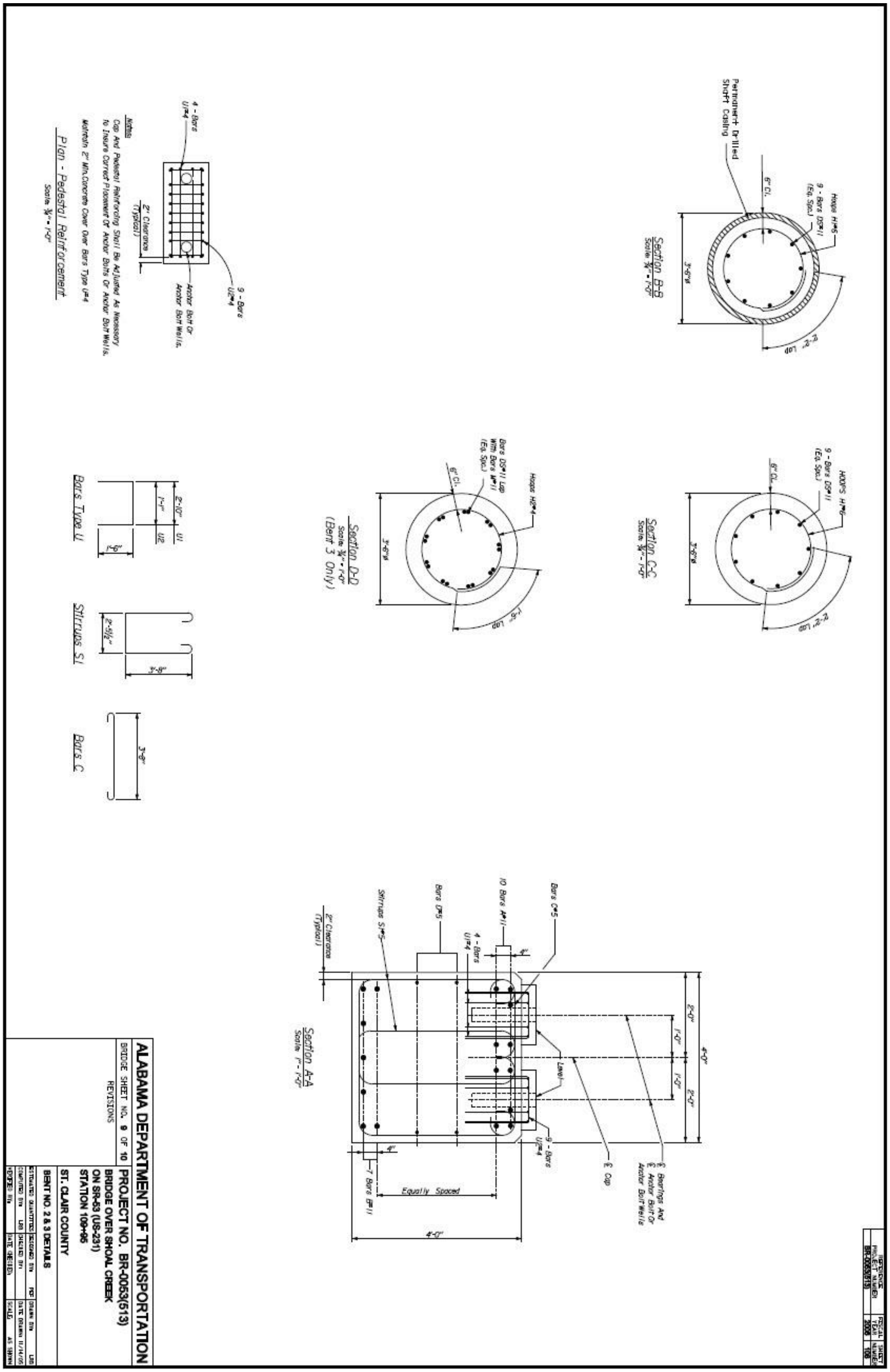
Span 1	Span 2	Span 3	Description
75	76	75	Cu. Yds. Superstructure Concrete
19254	19446	19254	Lbs. Steel Reinforcement
1460	1460	1460	Lbs. Structural Steel
320	325	320	Lin. Ft. Type II Girder

Location	Begin Bridge Station 109+95	℄ Bent No.2 Station 110+50	℄ Bent No.3 Station 111+05	End Bridge Station 111+40
Lt. Edge Slab	610.552	610.277	610.001	609.726
Tran. Gutter	610.369	———	———	609.744
Lt. Gutter	———	610.304	610.029	———
Gdr. No. 1	610.628	610.352	610.077	609.802
Gdr. No. 2	610.784	610.509	610.234	609.959
Gdr. No. 3	610.941	610.666	610.391	610.115
℄ Bridge	610.989	610.714	610.439	610.164
Gdr. No. 4	610.941	610.666	610.391	610.115
Gdr. No. 5	610.784	610.509	610.234	609.959
Gdr. No. 6	610.628	610.352	610.077	609.802
Rt. Gutter	———	610.304	610.029	———
Tran. Gutter	610.369	———	———	609.744
Rt. Edge Slab	610.552	610.277	610.001	609.726

Frame Drilled Shaft Example




Plan View - Bent #3
Elevation View - Bent No. 3
End View - Bent No. 3
Notes
Estimated Quantities
ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NO. BR-0053(513)
BRIDGE OVER SHOAL CREEK
ST. CLAIR COUNTY
BENT NO. 3

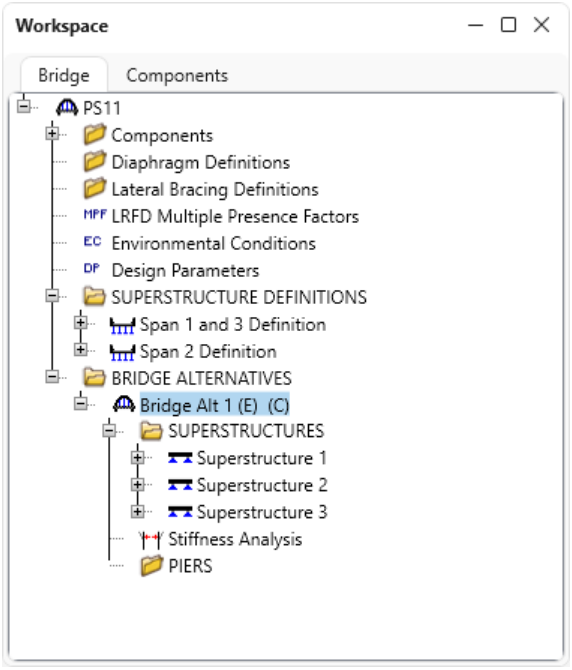

Section B-B
Section C-C
Section D-D
(Bent 3 Only)
Section A-A
Plan - Pedestal Reinforcement
Bars Type U
Stirrups S1
Bars C
ALABAMA DEPARTMENT OF TRANSPORTATION
PROJECT NO. BR-0053(513)
BRIDGE OVER SHOAL CREEK
ON SR-53 (US-231)
STATION 109+96
ST. CLAIR COUNTY
BENT NO. 2 & 3 DETAILS
REVISIONS

This example describes the entry of piers for a 3 simple span superstructure previously entered into BrDR as part of the Alabama BrD superstructure training session – **PS11 – Bridge Over Shoal Creek**. This example is part of the design portion of the training where users attempt to enter data on their own instead of following screen by screen captures. As such, this example does not describe data entry for each window. Instead, it shows only certain windows and describes important modeling concepts on these windows.

Locating Substructure Units

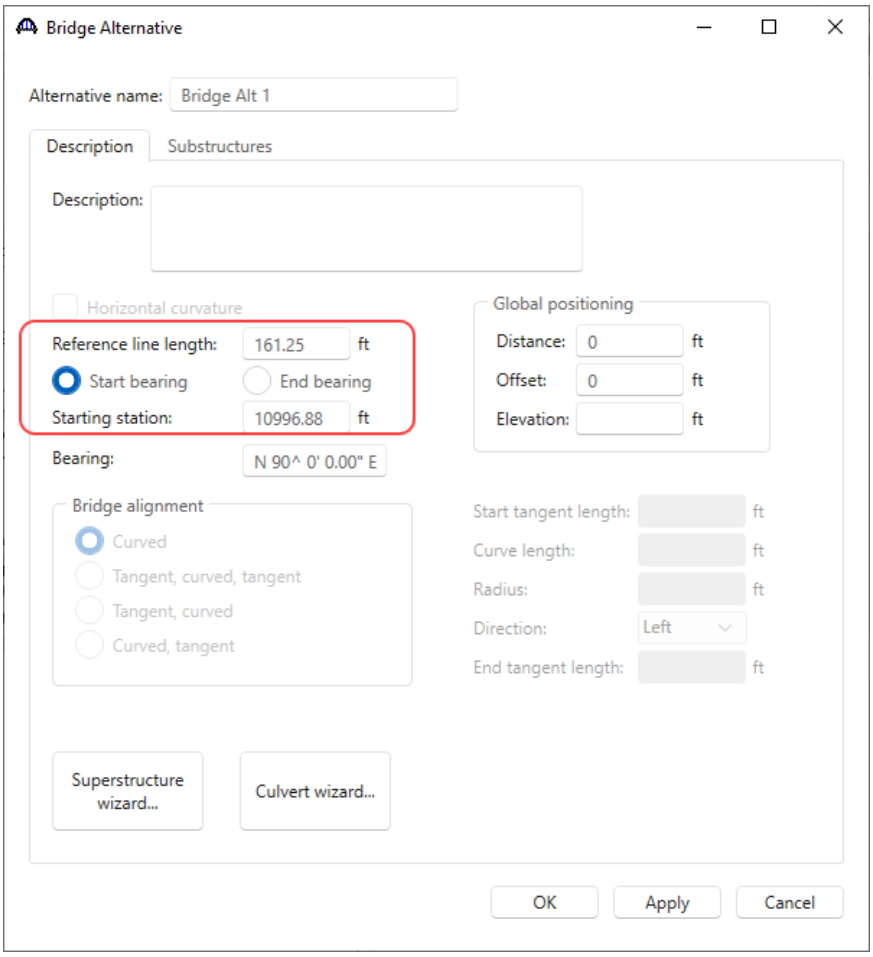
Open the bridge workspace for the **PS11 – Bridge Over Shoal Creek** tutorial and open the **Bridge Alternative** window shown below.

The partially expanded **Bridge Workspace** tree is shown below.

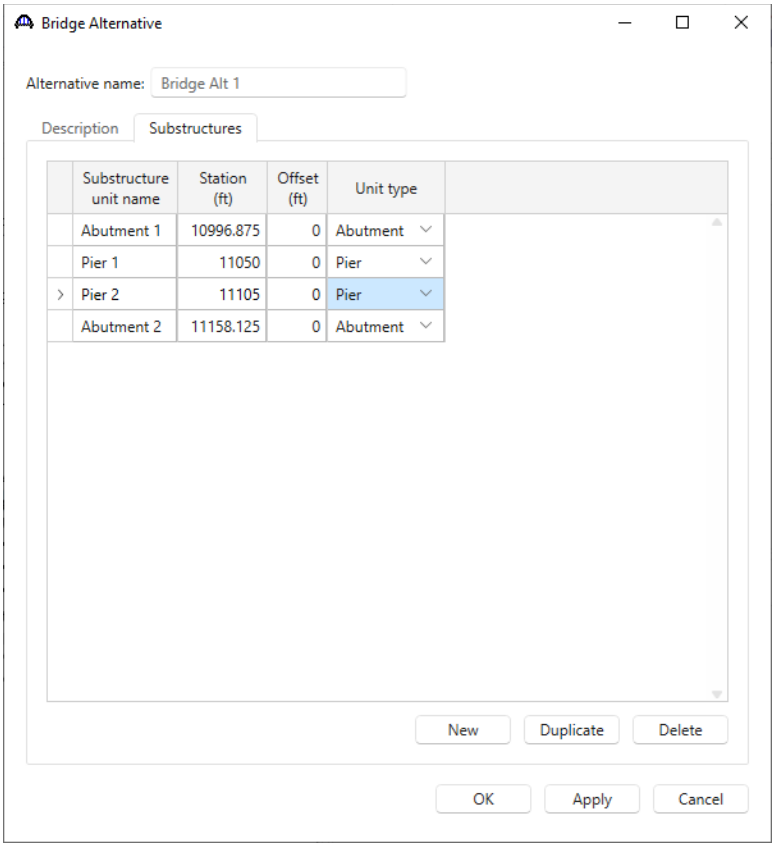


Bridge Alternative

The reference line length is the length between the abutment bearings. The stating station is abutment 1 CL Brg station.

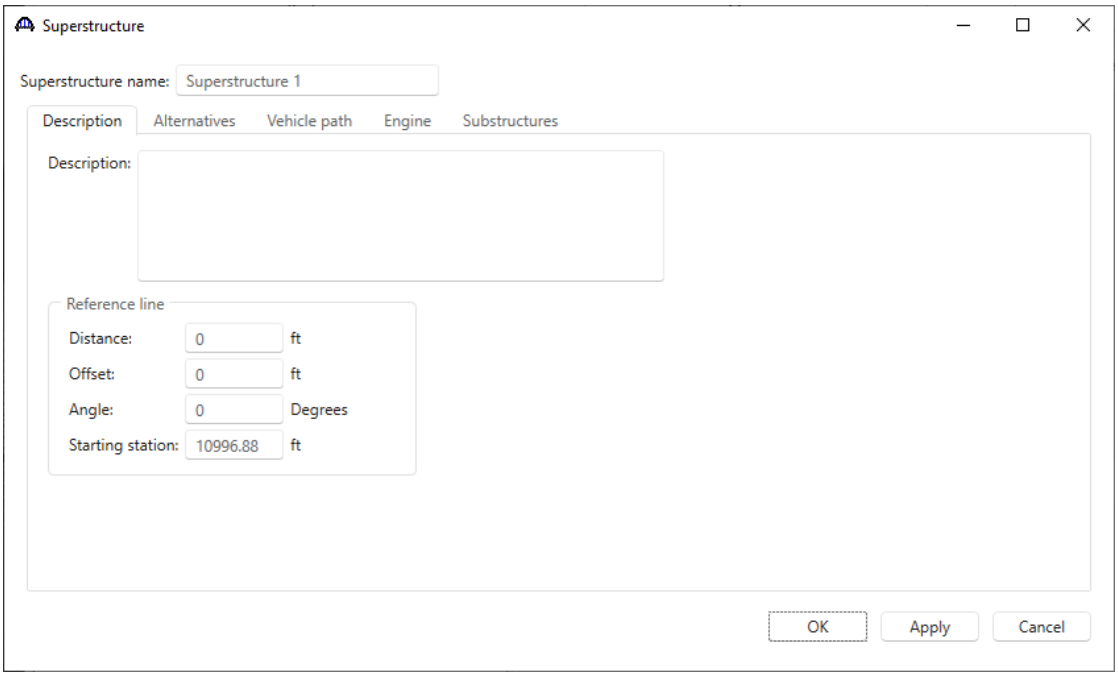


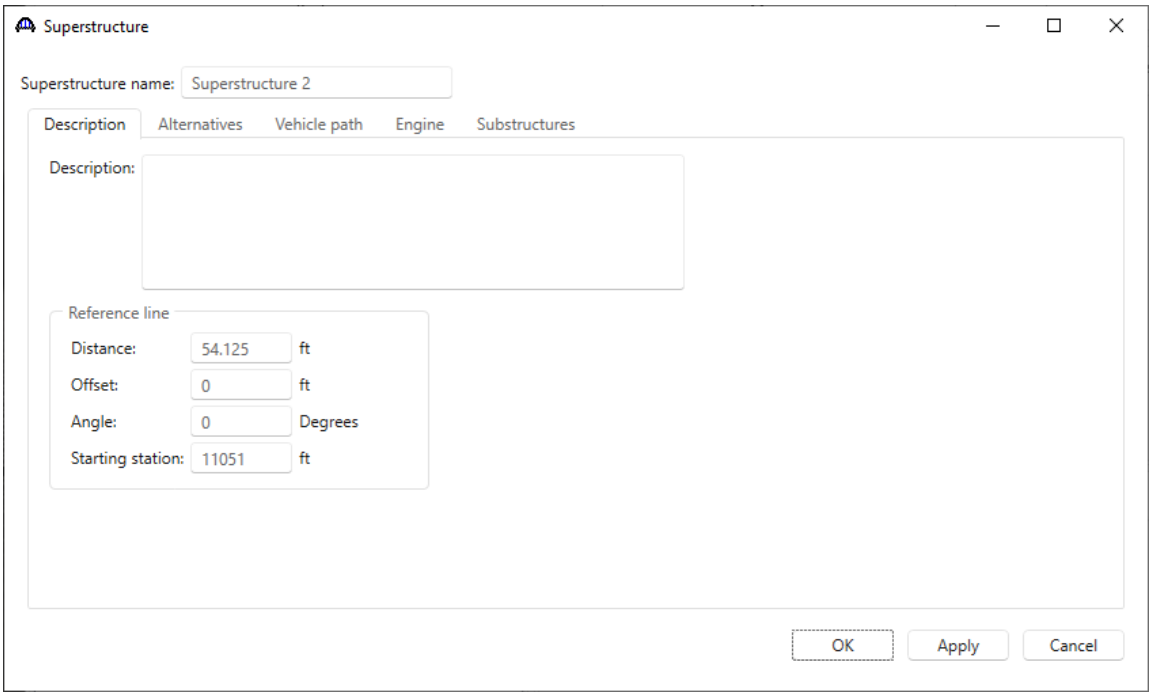
Navigate to the **Substructures** tab. The substructure locations are defined as follows:

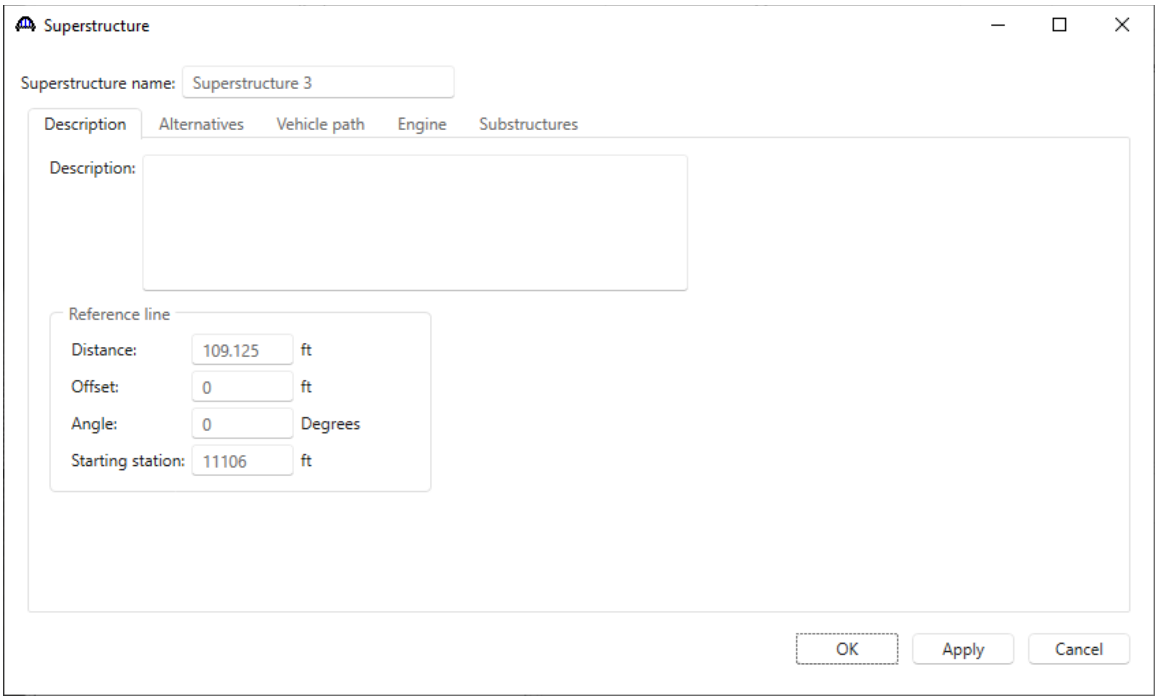


Superstructure

The individual **Superstructure** windows are shown below.

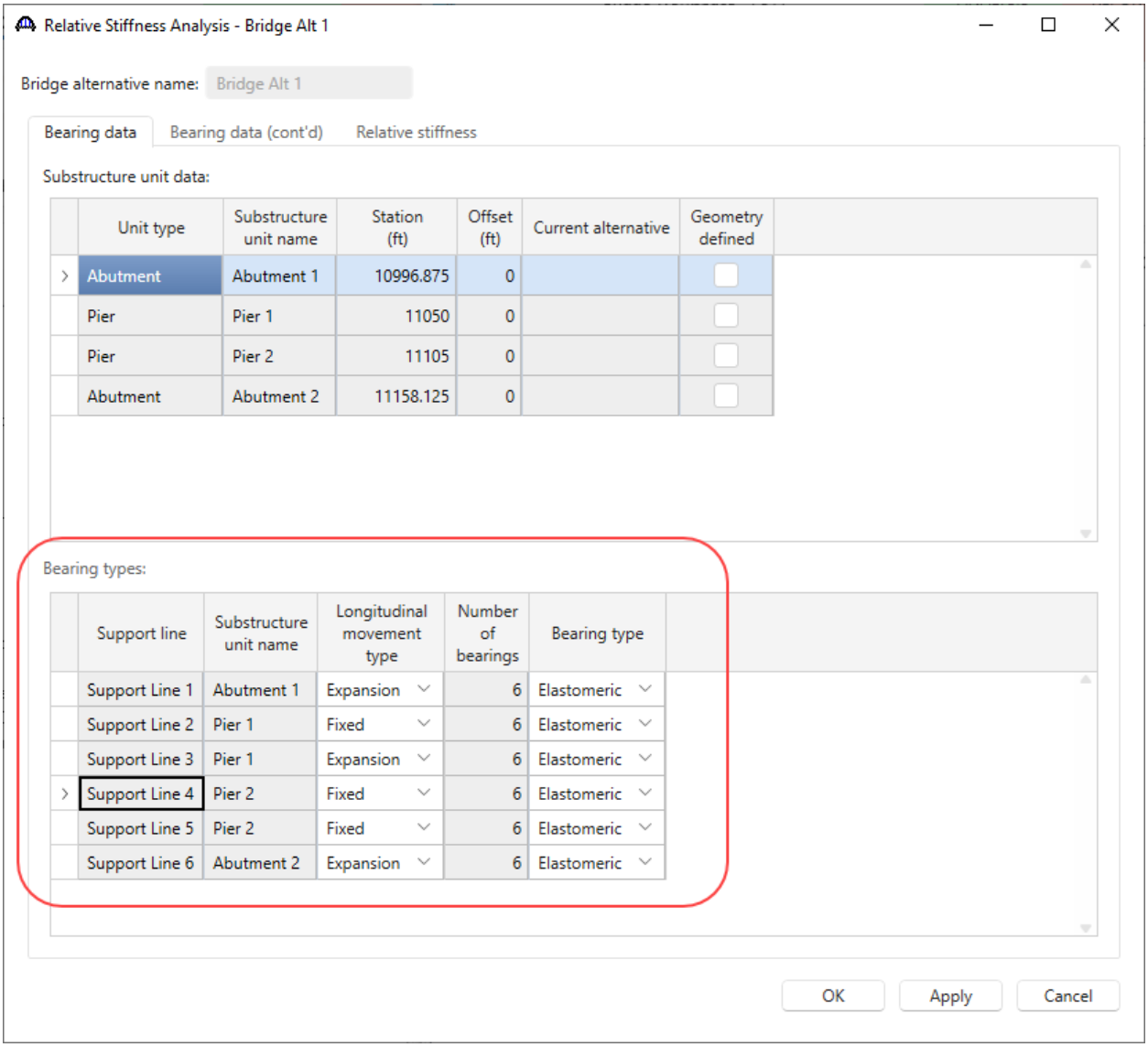



Superstructure
Superstructure name: Superstructure 2
Description
Alternatives
Vehicle path
Engine
Substructures
Description:
Reference line
Distance: 54.125 ft
Offset: 0 ft
Angle: 0 Degrees
Starting station: 11051 ft
OK
Apply
Cancel

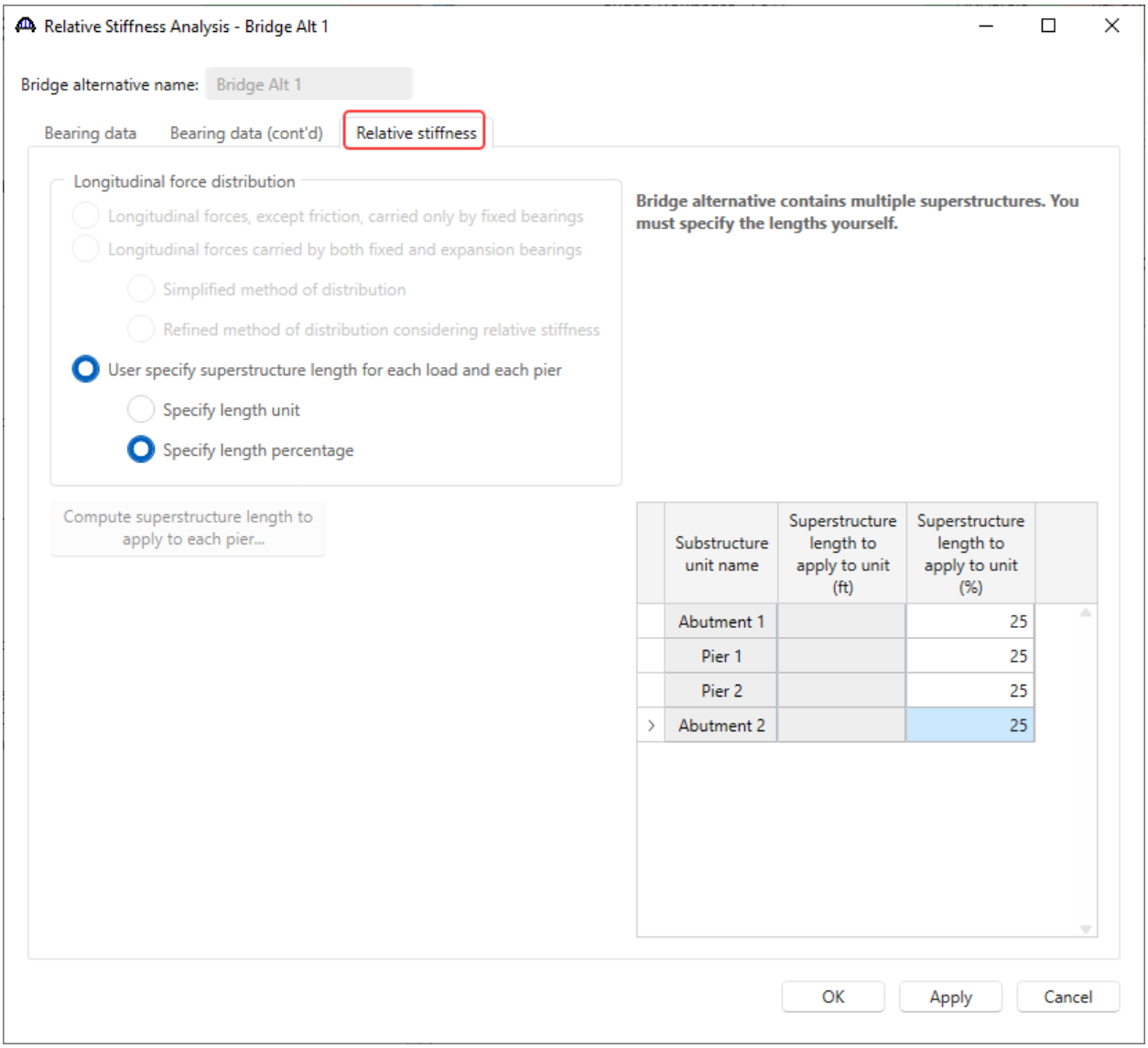

Superstructure
Superstructure name: Superstructure 3
Description
Alternatives
Vehicle path
Engine
Substructures
Description:
Reference line
Distance: 109.125 ft
Offset: 0 ft
Angle: 0 Degrees
Starting station: 11106 ft
OK
Apply
Cancel

Relative Stiffness Analysis

Revise the bearing types as follows.



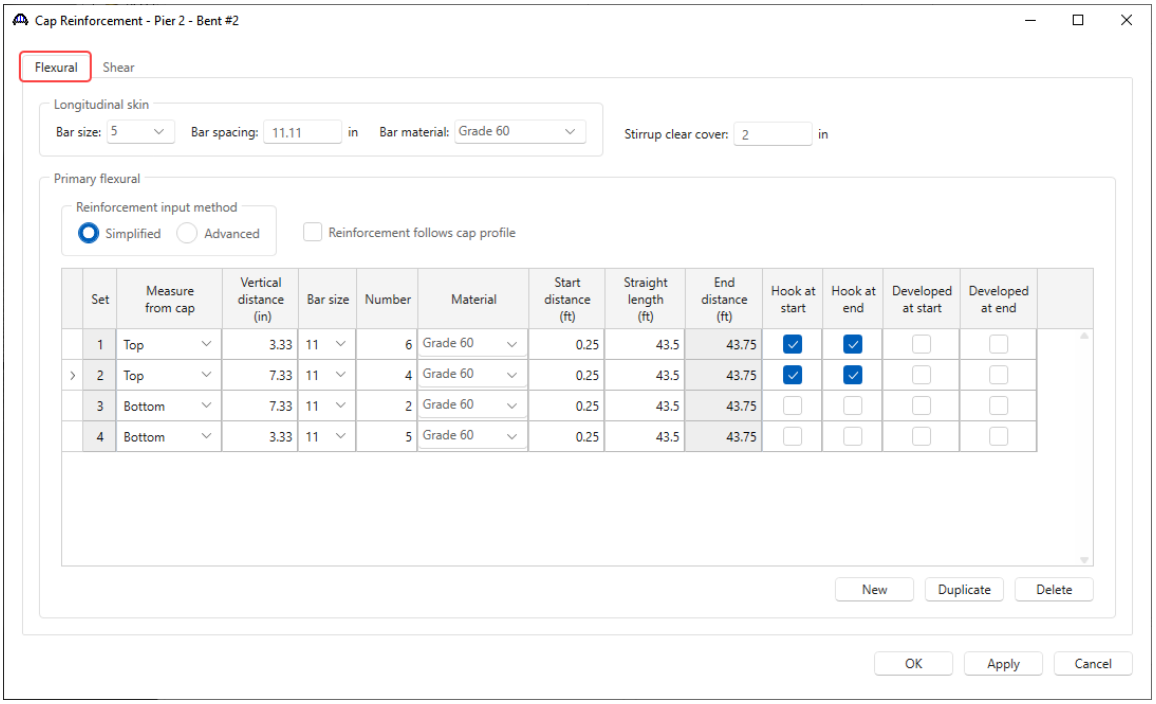
Since this bridge alternative contains multiple superstructures, the length of superstructure to load for each pier must be specified. Here both the fixed and expansion bearings are assumed to carry the longitudinal forces.

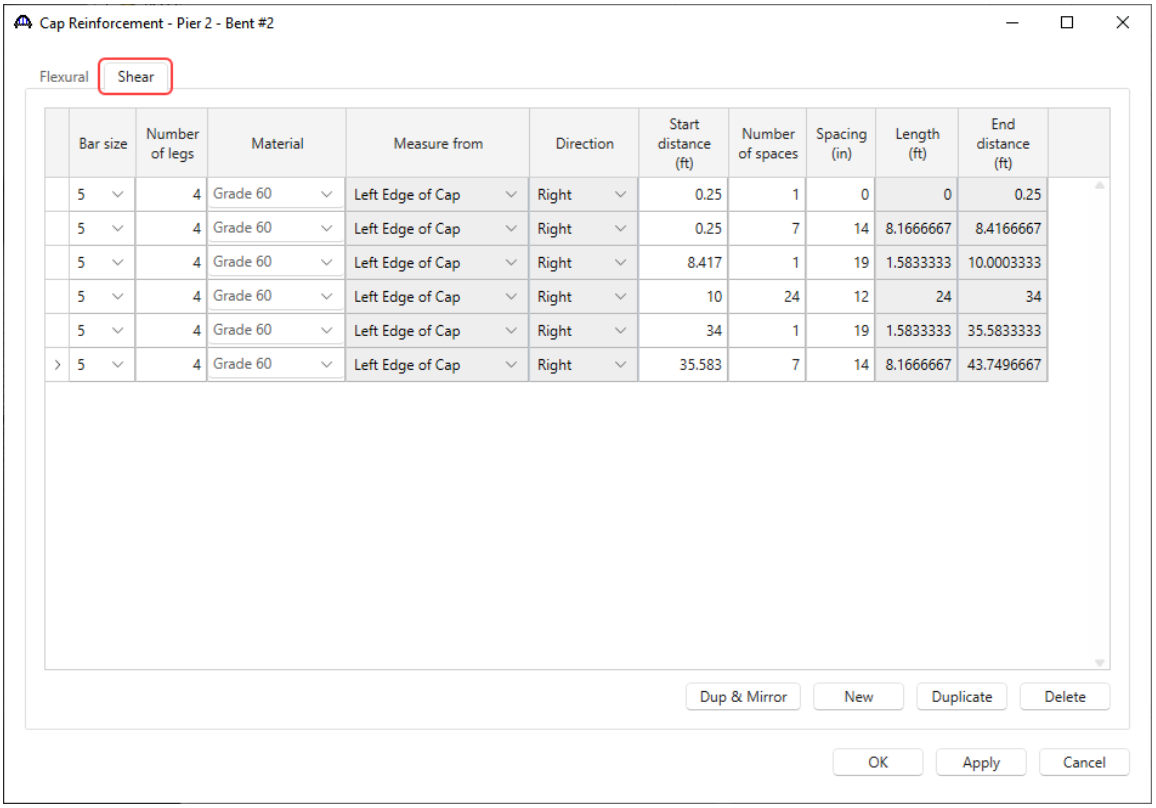


Bent #3 Description

Cap Reinforcement

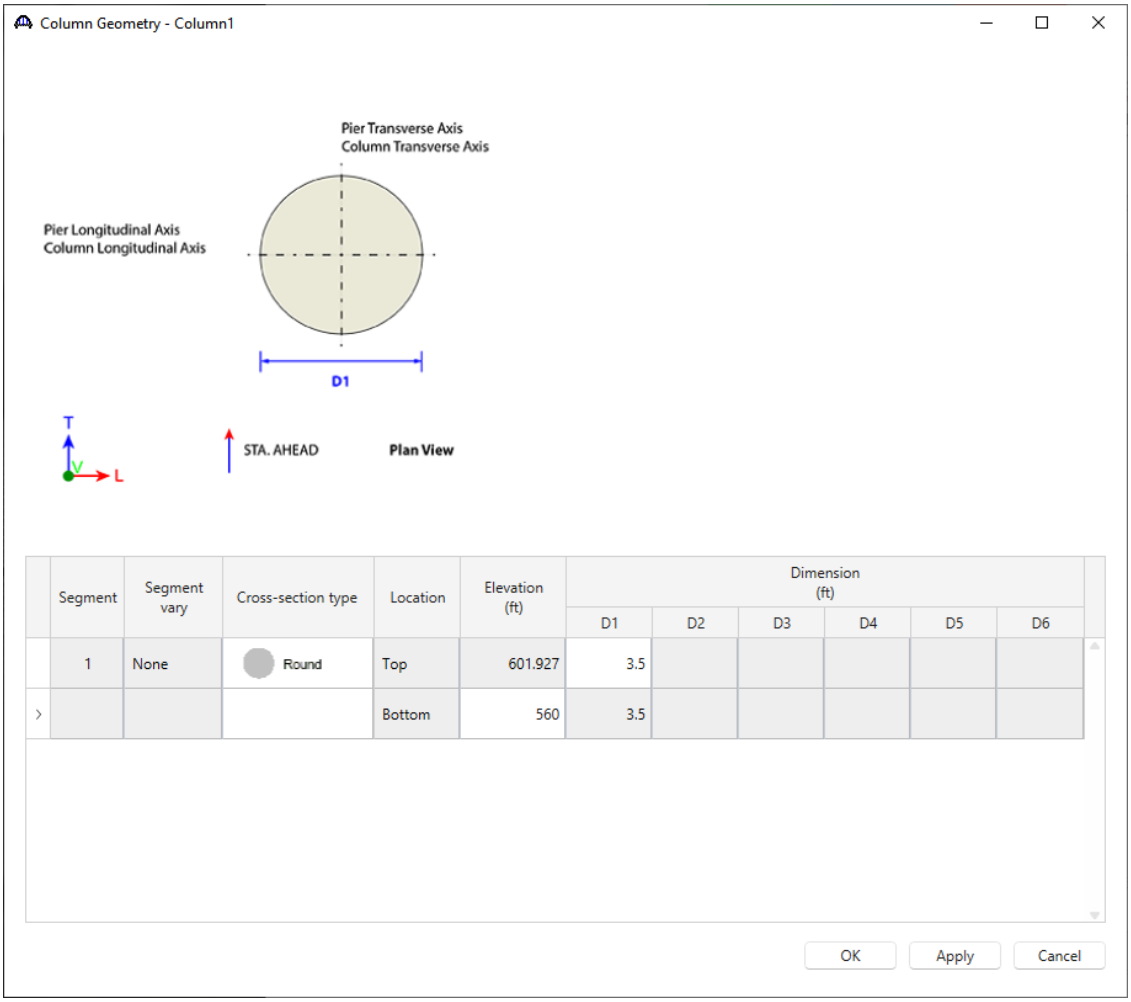
The cap reinforcement is entered as follows.



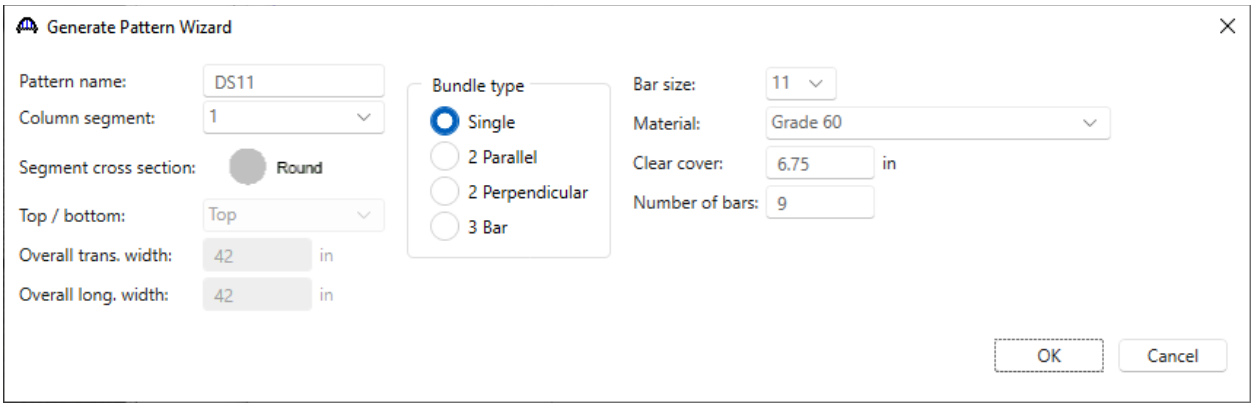


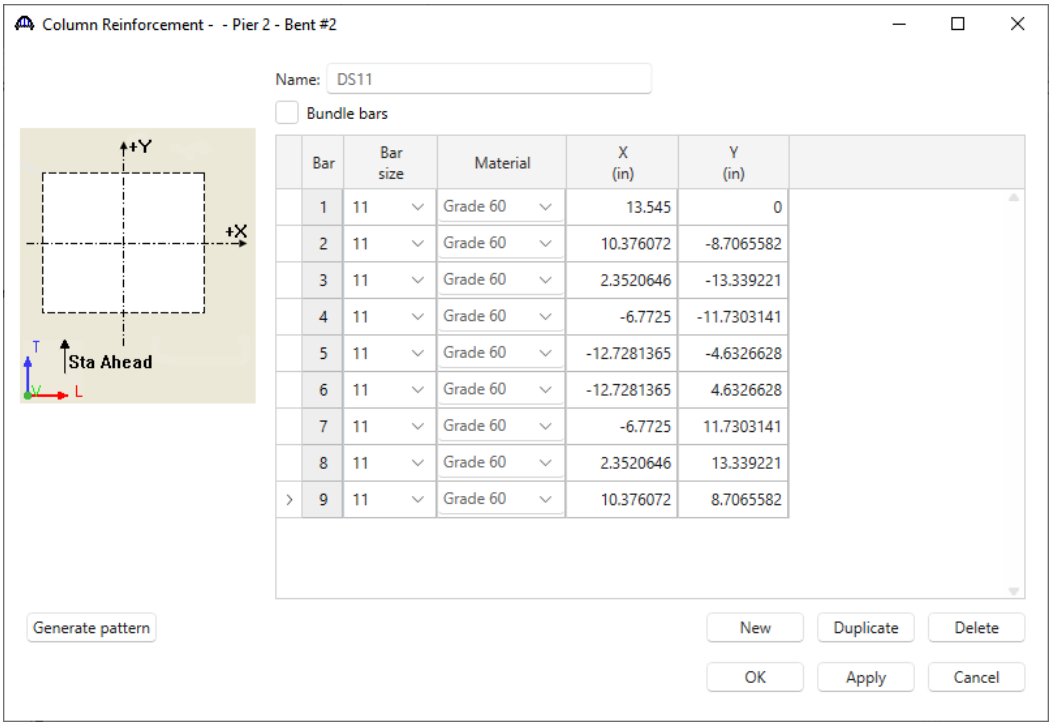
Column Geometry

The column geometry is defined as follows. Enter the concrete column diameter as 3.5’ and neglect the steel casing.

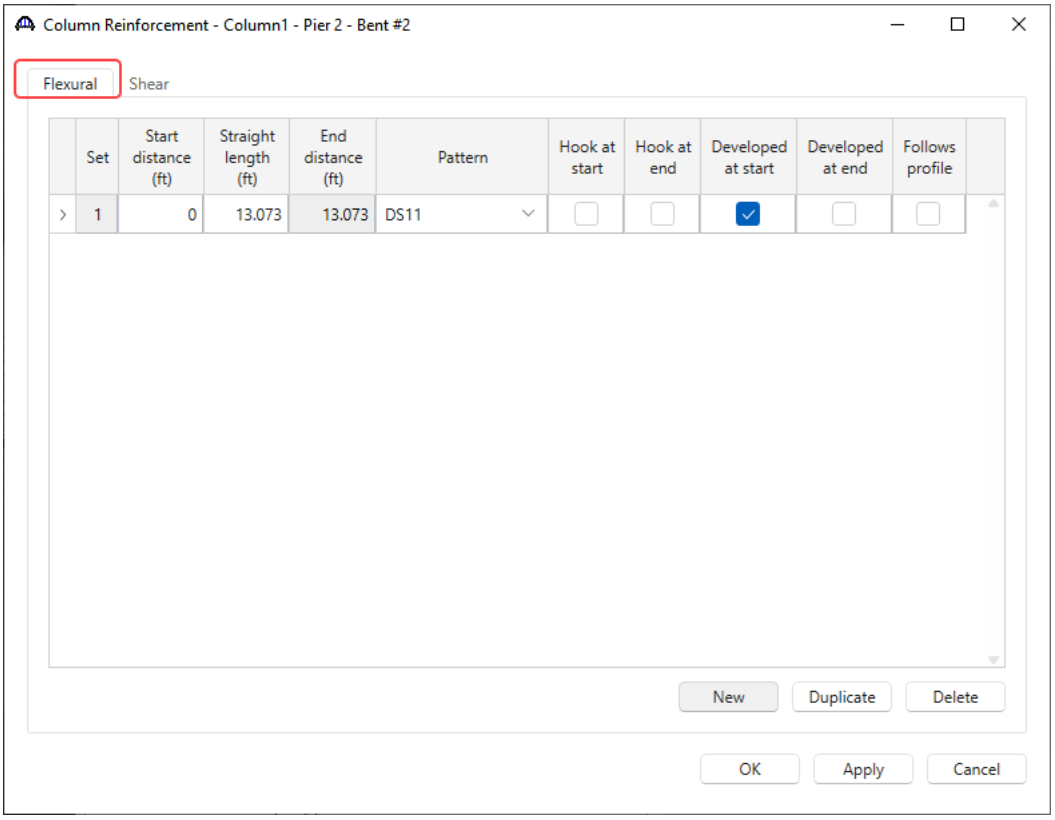


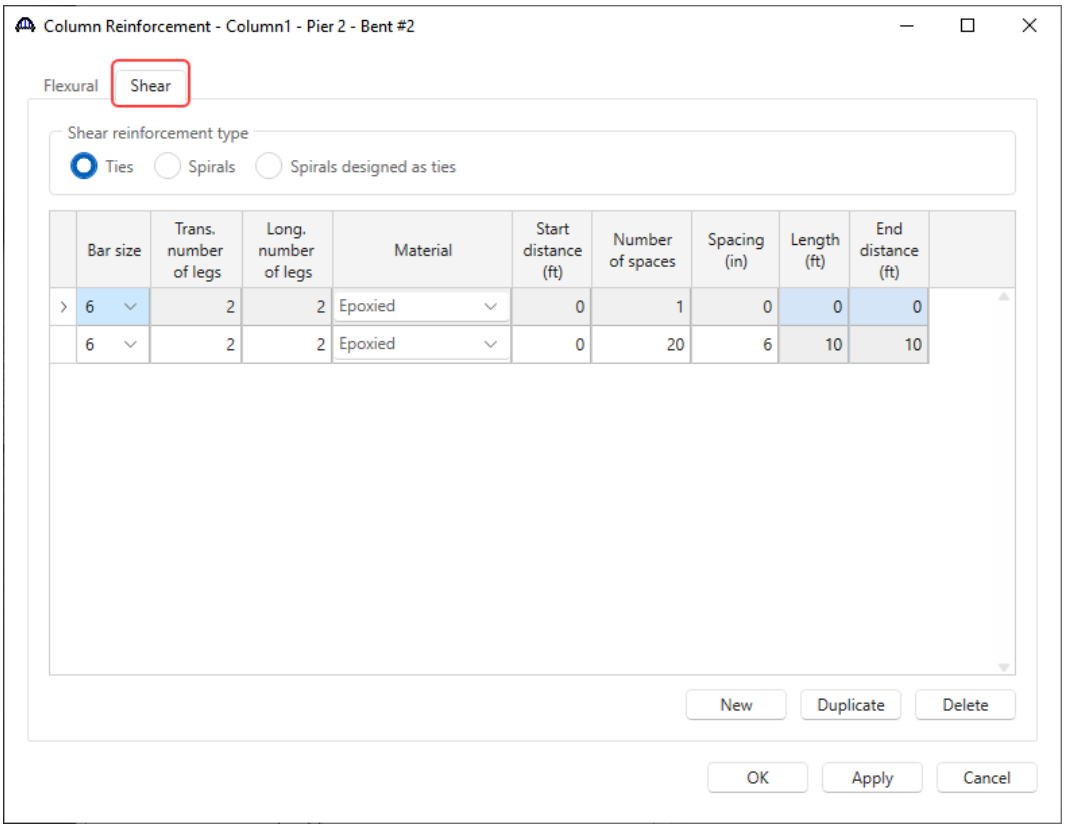
Column Reinforcement





Developed at start is checked to assume actual length of drilled shaft below point of fixity provides enough length for bars to be developed.




Column Reinforcement - Column1 - Pier 2 - Bent #2
Flexural
Shear
Shear reinforcement type
Ties
Spirals
Spirals designed as ties
Bar size
Trans. number of legs
Long. number of legs
Material
Start distance (ft)
Number of spaces
Spacing (in)
Length (ft)
End distance (ft)
6 2 2 Epoxied 0 1 0 0 0
6 2 2 Epoxied 0 20 6 10 10
New
Duplicate
Delete
OK
Apply
Cancel