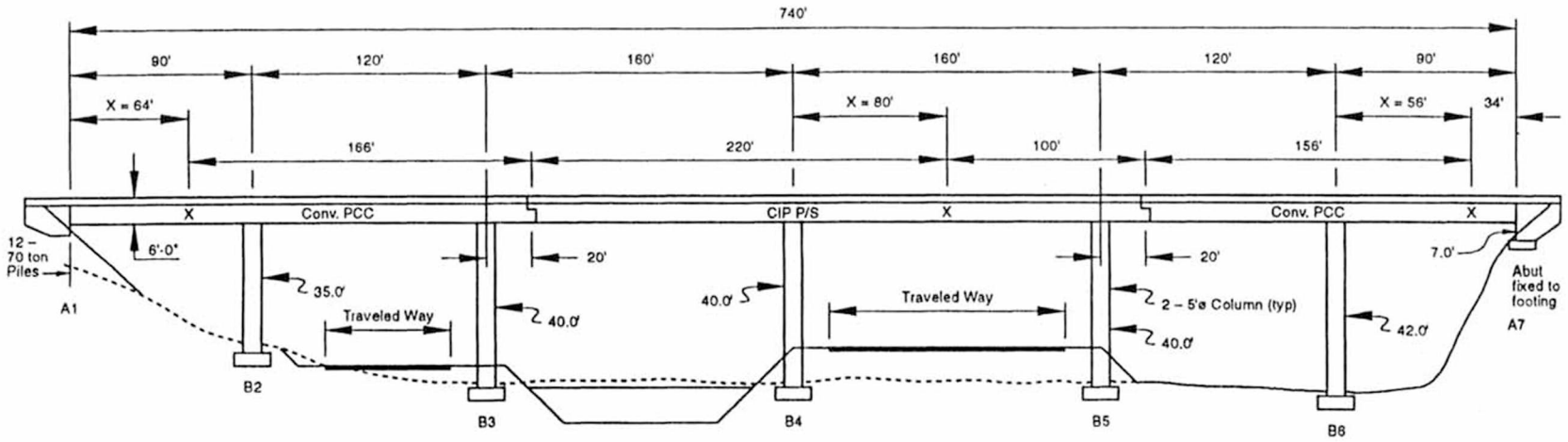
Attachment 1

Example No. 1

Calculation of Points of No Movement



	A1		B2		B3			B4		B5			B6		A7		
I (Ft)^4	1.38		61.36		61.36			61.36		61.36			61.36		102		
L (Ft)	5.50		35.0		40.0		Sum	40.0		40.0		Sum	42.0		7.0		Sum
P (kips) @ 1" side sway	1200	+	618	+	415	=	2,233	415	+	415	=	830	359	Will slide +	600	=	959
D (distance from 1st member of frame)	0		90		210			0		160			0		90		
P × D / 100	0	+	556	+	872	=	1,428	0	+	664	=	664	0	+	540	=	540
$X = \frac{\Sigma(P \times D)/100}{\Sigma P}(100) = \frac{1,428}{2,233}(100) = \underline{64'}$								$\frac{664}{830}(100) = \underline{80'}$					$\frac{540}{959}(100) = \underline{56'}$				

Notes:
- Width of Structure = 78'
- Diameter of Column = 5'-0"
- K/Pile @ 1" deflection = 100 kips
- Point of No Movement = X
- Refer to Properties/Piles Table

Assumptions:
1. Super str. Inf. rigid
2. Columns fixed top and bottom
3. Abutment footing will slide @ a force equal to D.W.
4. E (piles) = 4×10^6 psi
   E (columns) = 3×10^6 psi

Fixed/Fixed Condition

$$P\,(Col.) = 12EI\,\frac{\Delta}{L^3}$$

$$@\ 1"\ defl. = \frac{432\,I}{\left(\frac{L}{10}\right)^3}$$

Pinned/Fixed Condition

$$P\,(Col.) = 3EI\,\frac{\Delta}{L^3}$$

$$@\ 1"\ defl. = \frac{108\,I}{\left(\frac{L}{10}\right)^3}$$

D.W. Abut 7 = 600 k (assume linear up to 1" deflection)

$$I\,(abut) = \frac{78}{12}(2.5)^3 = 102$$