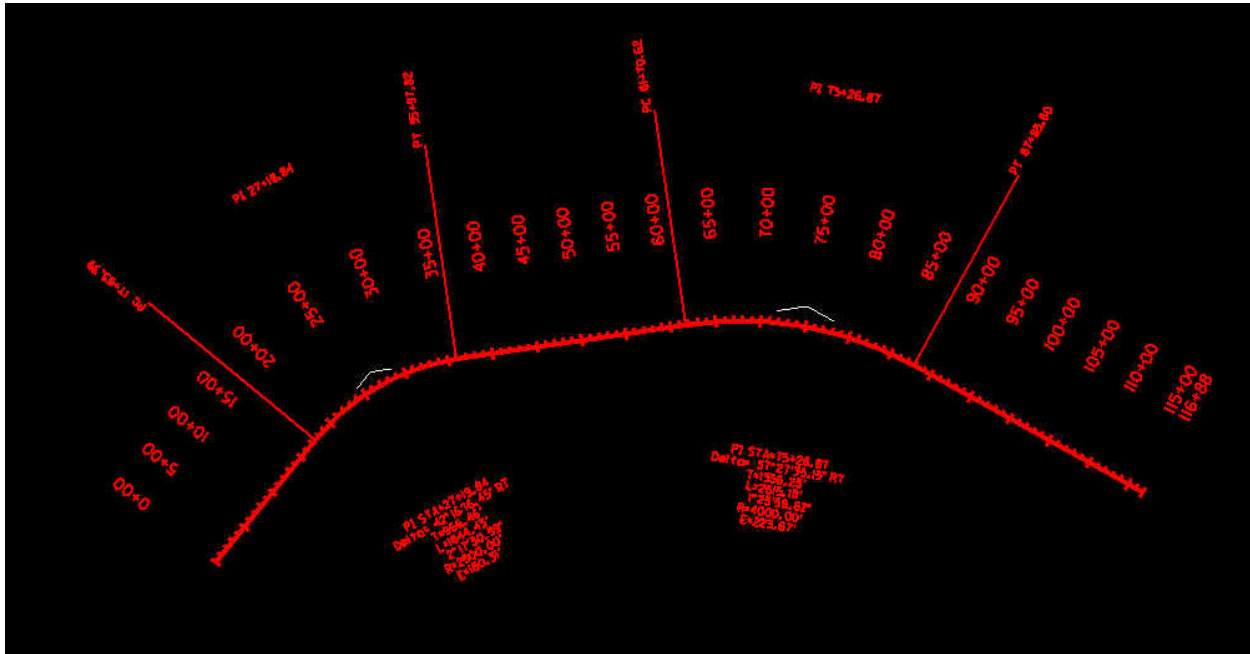


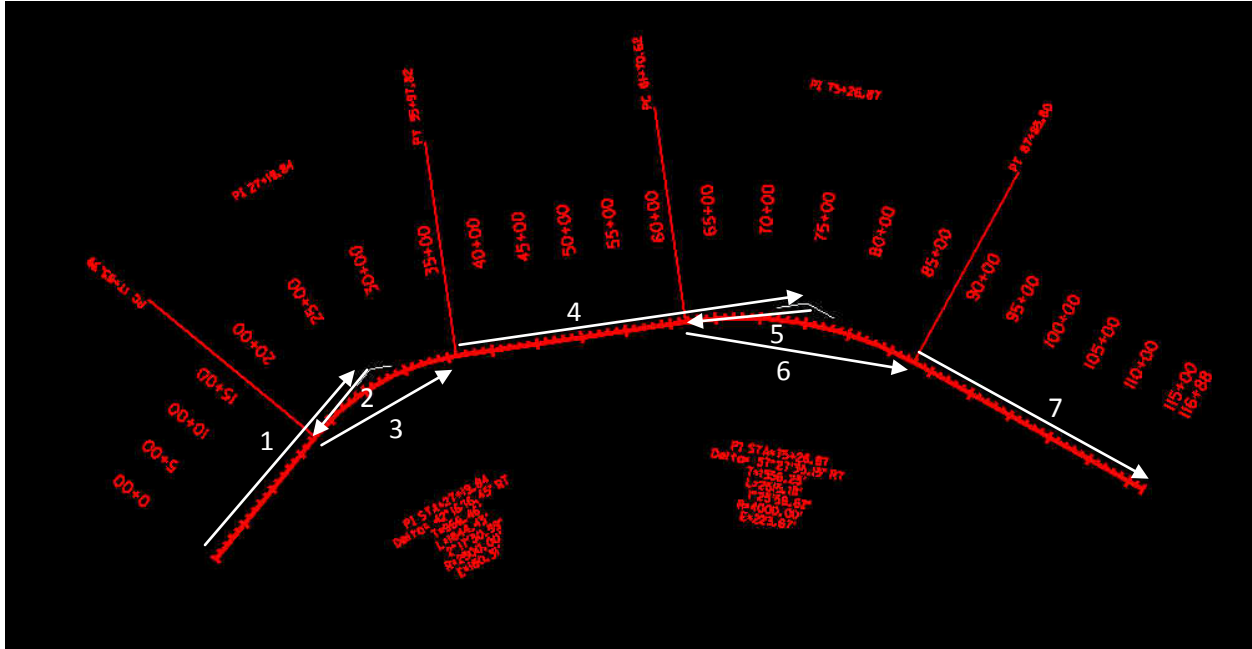
We will start with a simple curve without spirals. If you remember how alignments are stationing, then you know that the PI is stationed from the previous cardinal point (PT, PCC, etc.). So your PI station is not stationed from your curved alignment per se. I have created a little example to exhibit this point.



I have annotated the stationing and the curve data. The first PI (PI 27+18.84) is stationed from station 0+00; it is located 2718.84' forward along the tangent. Based on the deflection angle and radius of curve, you can determine any other variable of the curve that you would like, but InRoads has given you the pertinent data in the curve set annotation. When you are initially laying out the alignment, you set the PIs and then come back and place the curves later. So, initially, you do not have any PCs or PTs. You calculate those stations based on the PI stations and the curve geometry. The first PC station is determined by subtracting the first curve's tangent length from the PI station (27+19.84 minus 966.46' = 17+53.39 with the 0.01 difference due to rounding). But this is not the same for calculating the PT! If you try the same methodology but instead of subtracting from the PI station, you add to the PI station (27+19.84 plus 966.46' = 36+86.30 which DOES NOT equal 36+97.82). The way the PT is calculated is from the PC. You add the length of curve to the PC station to get the PT station (17+53.39 plus 1844.43' = 35+97.82).

Now if you go to the second PI, the linear distance between the first PI and the second PI is 4895.50' (I measured it in MicroStation). If you just add that length to the first PI station you come up with a second PI station of 76+15.34 (27+19.84 plus 4895.50' = 76+15.34 which is not 75+26.87). The second PI is stationed from the immediately previous cardinal point (which in this case is the PT at station 35+97.82 because at the time the second PI was stationed, the second PC did not exist). The total length between the first PT and the second PI is 3929.05', which is the total length between the PIs minus the first curve tangent length (4895.50' minus 966.46' = 3929.05' with the 0.01' difference due to rounding). So to station the second PI, you add that distance to the first PT (35+97.82 plus 3929.05' = 75+26.87). And you follow the same approach as before to determine the stationing of the second PC

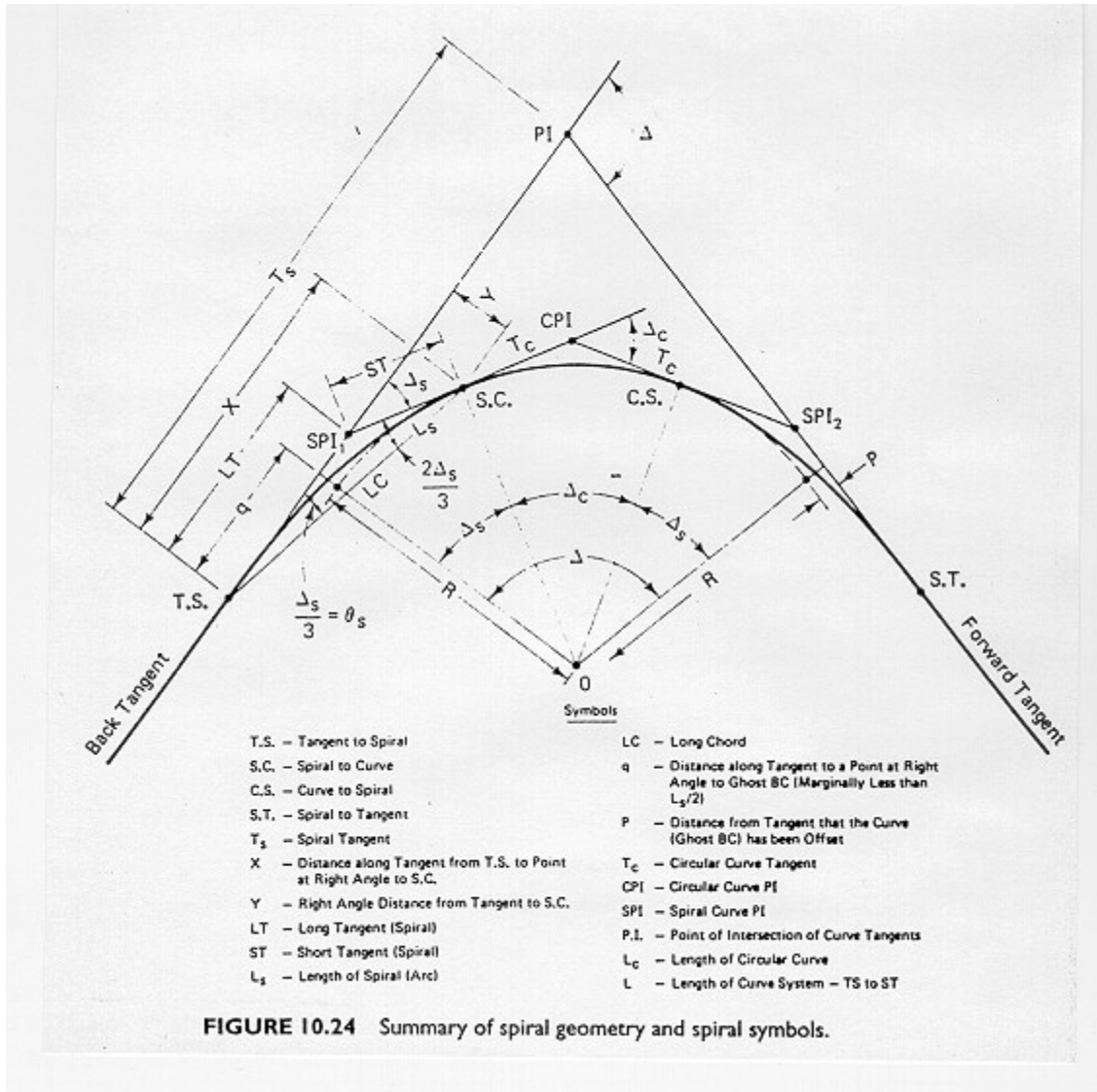
and PT. So in essence, you are stationing in this order: POB, first PI, first PC, first PT, second PI, second PC, second PT, POE.



Note: it is ill-advised to start your alignment at station 0+00, as shown in the example above. If the alignment were to be extended to the left, it would result in negative stationing. For example, starting with STA 10+00 allows you a buffer in case of changes to the point of beginning.

So to cover a portion of your concern, the PIs **ARE NOT** stationed perpendicular to the alignment; anytime you “track” to your PI from the alignment you **WILL NOT** get the correct station.

Now to talk about spiral curves. I have included a picture of a spiral curve with its dimensions, etc.



If you notice, the spiral curve actually has **FOUR** PIs. Two spiral PIs—or the PIs for the spirals themselves, one circular PI—or the PI for the simple curve only, and the PI that we place on our plan sheets—the true point of intersection of the two tangents. The process for stationing a spiral curve is similar to the process for a circular curve. You station the main PI from the immediately previous cardinal point. The TS is determined by subtracting the T_s distance from the PI station. To determine the station of the SC, you add the length of spiral to the TS station. The CS is determined like the PT on a simple curve where you add the length of curve to the SC station. The ST is calculated from the CS by adding on the length of spiral.

Having gone through that, when you review your geometry from InRoads using “Alignment” mode, it is giving you the small PIs and the circular PI, but not the main PI. So the CPI that InRoads has given you is stationed from the SC and not the POB as you were wanting. If, however, you switch the

review mode from “Alignment” to “Curve Sets” you will see the main PI listed as well as the spiral PIs but not the circular PI.

To speak to the other parts of your concern, you are correct. When you review the geometry, it does not give you the proper PI (in the alignments mode). Of course, this is only a problem when dealing with spiral curves as well as compound curves. This does not mean, however, that the data provided is incorrect, only that it is reporting different data for the same curve. In short, the **CORRECT** PI is the one that InRoads lists when you annotate the curve data. This is the one we show on the plans.

If you have any questions about this document, please contact the KYTC Highway Design Developmental Branch at 502-564-3280.