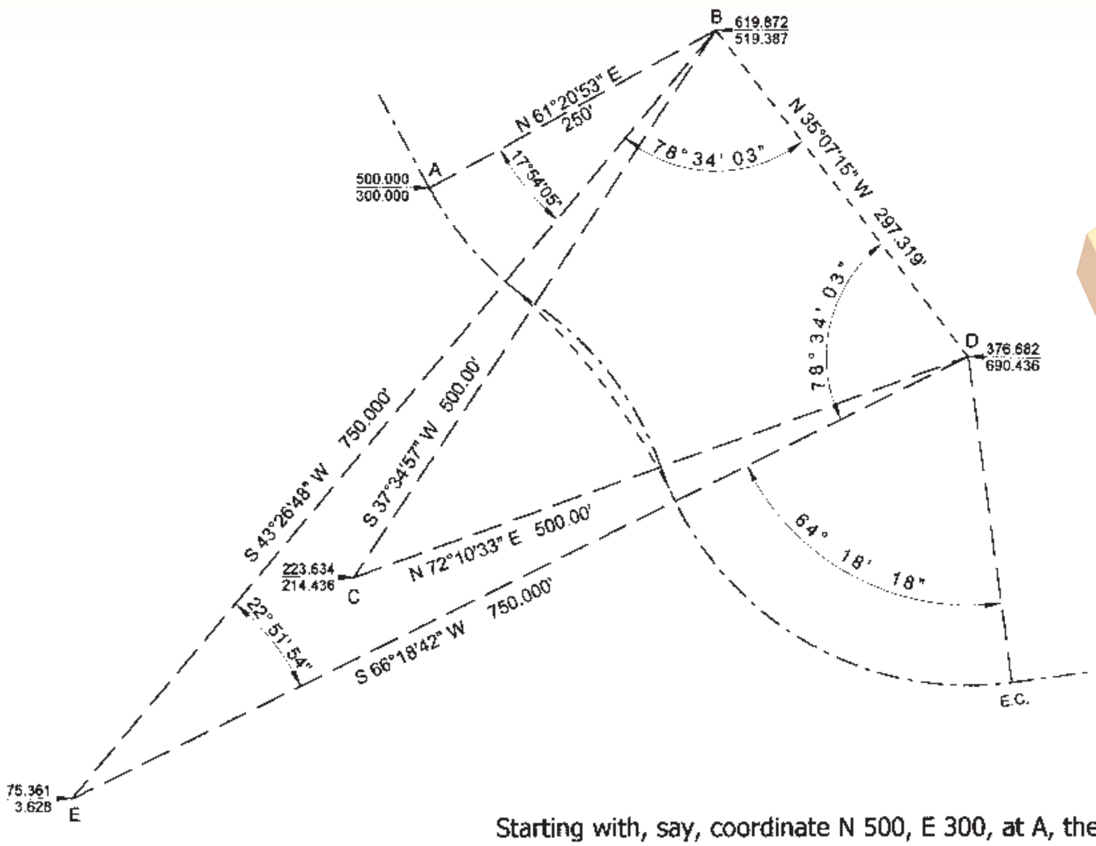
Solution to Problem 93



Starting with, say, coordinate N 500, E 300, at A, the B.C., traverse through the three existing radius points, B, C and D.

Inverse from D to B to get N 35°07'15" W 297.319'.

Point E, the new radius point, is 750' from B and D.

With three sides of triangle E-B-D, calculate the three angles by the Law of Cosines:

$$\cos B\text{-}E\text{-}D = \frac{750^2 + 750^2 - 297.319^2}{(2)(750)(750)} = 0.921423478$$

Angle B-E-D = 22°51'54"

$$\cos E\text{-}B\text{-}D = \cos E\text{-}D\text{-}B = \frac{750^2 + 297.319^2 - 750^2}{(2)(750)(297.319)} = 0.198212667$$

Angle E-B-D = angle E-D-B = 78°34'03"

Calculate bearings for B-E and D-E from angles E-B-D and E-D-B.

Differences of bearings between A-B and B-E gives the new central angle of the first 250' radius curve. Angle B-E-D is the central angle of the new 500' radius curve. Difference of bearings between D-E and the E.C. gives the new central angle of the last 250' radius curve.

Solution to Problem 94

For the old curves:

$$L_1 = (23°45'56") \times (\pi / 180) \times 250' = 103.70' + 10+00 = 11+03.70$$

$$L_2 = (34°35'36") \times (\pi / 180) \times 250' = 150.94' + 1103.70 = 12+54.64$$

$$L_3 = (70°10'09") \times (\pi / 180) \times 250' = 306.17' + 1254.65 = 15+60.81$$

For the new curves:

$$L_1 = (17°54'05") \times (\pi / 180) \times 250' = 78.11' + 10+00 = 10+78.11$$

$$L_2 = (22°51'54") \times (\pi / 180) \times 500' = 199.53' + 1078.11 = 12+77.64$$

$$L_3 = (64°18'18") \times (\pi / 180) \times 250' = 280.58' + 1277.64 = 15+58.22$$

15+60.81 Ahead (on the old stationing line)
= 15+58.22 Back (on the new curves line)

