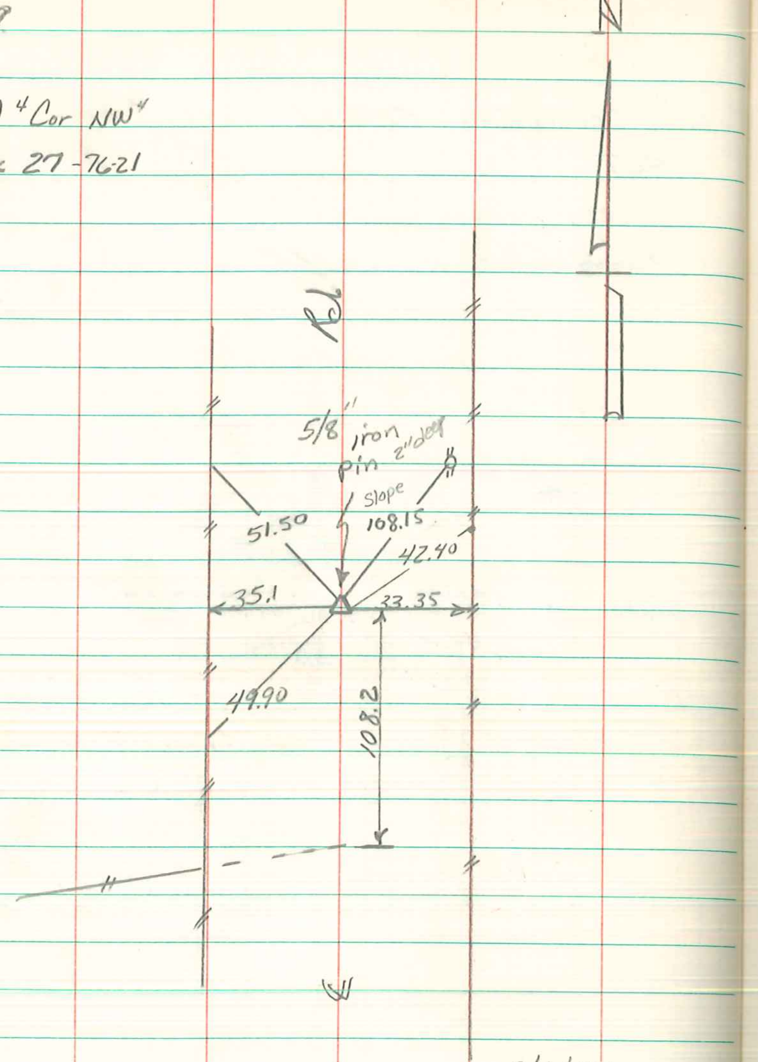
79

W 1/4 Cor NW 1/4
Sec 27-76-21



3/6/95
Abie Davis
4/13/2000 IDOT

CURVE AND REDUCTION TABLES

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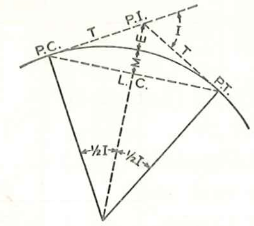

CURVE FORMULAS

1. Radius : $R=\frac{50}{\sin D/2}$
2. Degree of Curve: $D=100\frac{I}{L}$ Also, $\sin D/2=\frac{50}{R}$
3. Tangent : $T=R\tan \frac{1}{2} I.$ Also, $T=\frac{T \text{ for } 1° \text{ curve}}{D}+C.$
4. Length of Curve: $L=100\frac{I}{D}$
5. Long Chord : $L.C.=2R\sin \frac{1}{2} I.$
6. Middle Ordinate: $M=R\,(1-\cos \frac{1}{2} I)$
7. External : $E=\frac{R}{\cos \frac{1}{2} I}-R.$ Also, $E=T\tan \frac{1}{4} I.$

EXPLANATION AND USE OF TABLES

Given P.I. Sta. 83+40.7, I=45° 20′ and D=6°30′ find:

Stations—P. C. = P. I. − T. $T=\frac{T \text{ for } 1° \text{ Curve}}{D}+$ C. From Tables V and VI $T=\frac{2392.8}{6.5}+.197=368.32=3+68.32$. Sta. P. C. =83+40.7−(3+68.32) =79+72.38.

P. T. =P. C.+L, and $L=100\ \frac{I}{D}=100\ \frac{45.33}{6.5}=697.38$ Therefore, P. T. =(79+72.38) +(6+97.38) =86+69.76.

Offsets—Tangent offsets vary (approximately) directly with D and with the square of the distance. From Table III Tangent Offset for 100 feet =5.669 feet. Distance =80−Sta. P. C. =27.62. Hence offset $=5.66\times\left(\frac{27.62}{100}\right)^2=.432$ ft. Also, square of any distance, divided by twice the radius equals (approximately) the distance from tangent to curve. Thus $(27.62)^2\div(2\times881.95)=.432$ ft.

Deflections—Deflection angle = ½ D for 100 ft., ¼ D for 50 ft., etc. For "X" ft. Deflection Angle (in minutes) =.3×X×D. For Sta. 80 of above curve Deflection Angle =.3×27.62×6.5=53.86′. Also Deflection Angle =dfl. for 1 ft. from Table III ×X=1.95 ×27.62=53.86′. For Sta. 181 Deflection Angle $=53.86'+\frac{6° 30'}{2}=4° 8.86'$.

Externals—From Table V for 1° curve, with central angle of 45° 20′, E=479.6. Therefore, for 6° 30′ curve, $E=\frac{479.6}{6.5}+$ Correction from Table VI =7.378+.039=7.417.