



ARORA and ASSOCIATES, P.C.

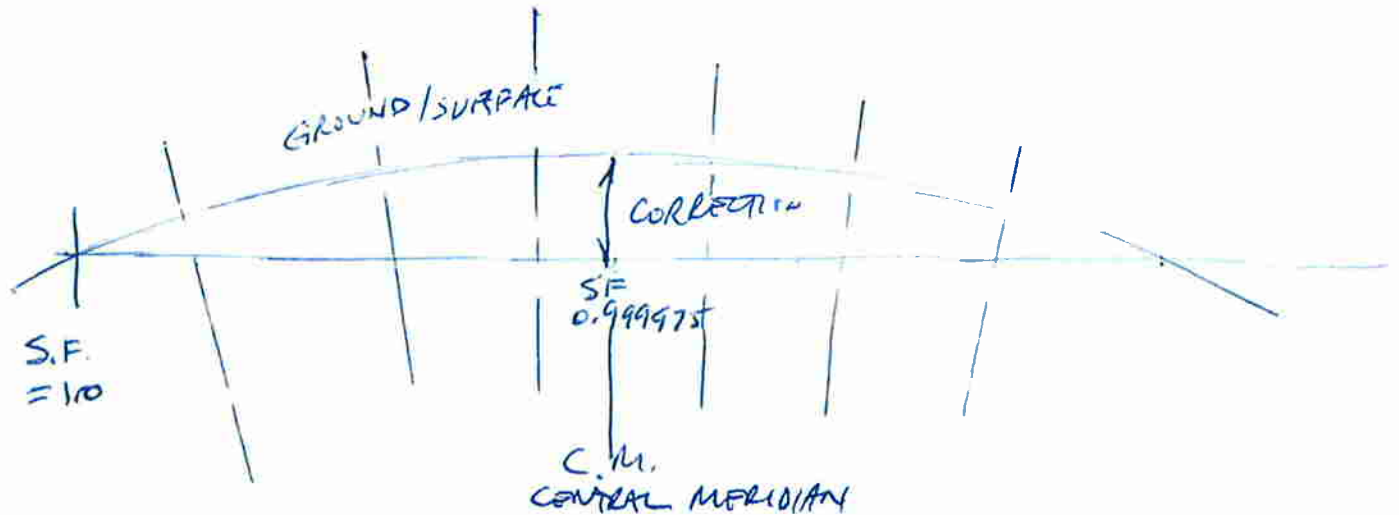
Consulting Engineers

SHEET NO. 1 OF

JOB _____ PREPARED BY [Signature] DATE _____

JOB NO. _____ CHECKED BY _____ DATE _____

SUBJECT NJ STATE PLANE COORDINATE SYSTEM
NSPCS



RADIUS OF THE EARTH use 20,906,000

NAD 27 MAXIMUM CORRECTION AT THE CENTRAL MERIDIAN

$$1 \text{ PART IN } 40,000 = 25 \text{ ppm}$$

25 parts per million

$$\text{CORRECTION AT THE C.M.} = 1 - 25 \text{ ppm} = 0.999975$$

THE CORRECTION DECREASES EAST OR WEST OF THE C.M.

THE S.F. = 1.00 IS THE POINT E/W OF THE CENTRAL MERIDIAN

* NAD 83 where S.F. = 0.999900 (100 ppm)



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SHEET NO. 2 OF

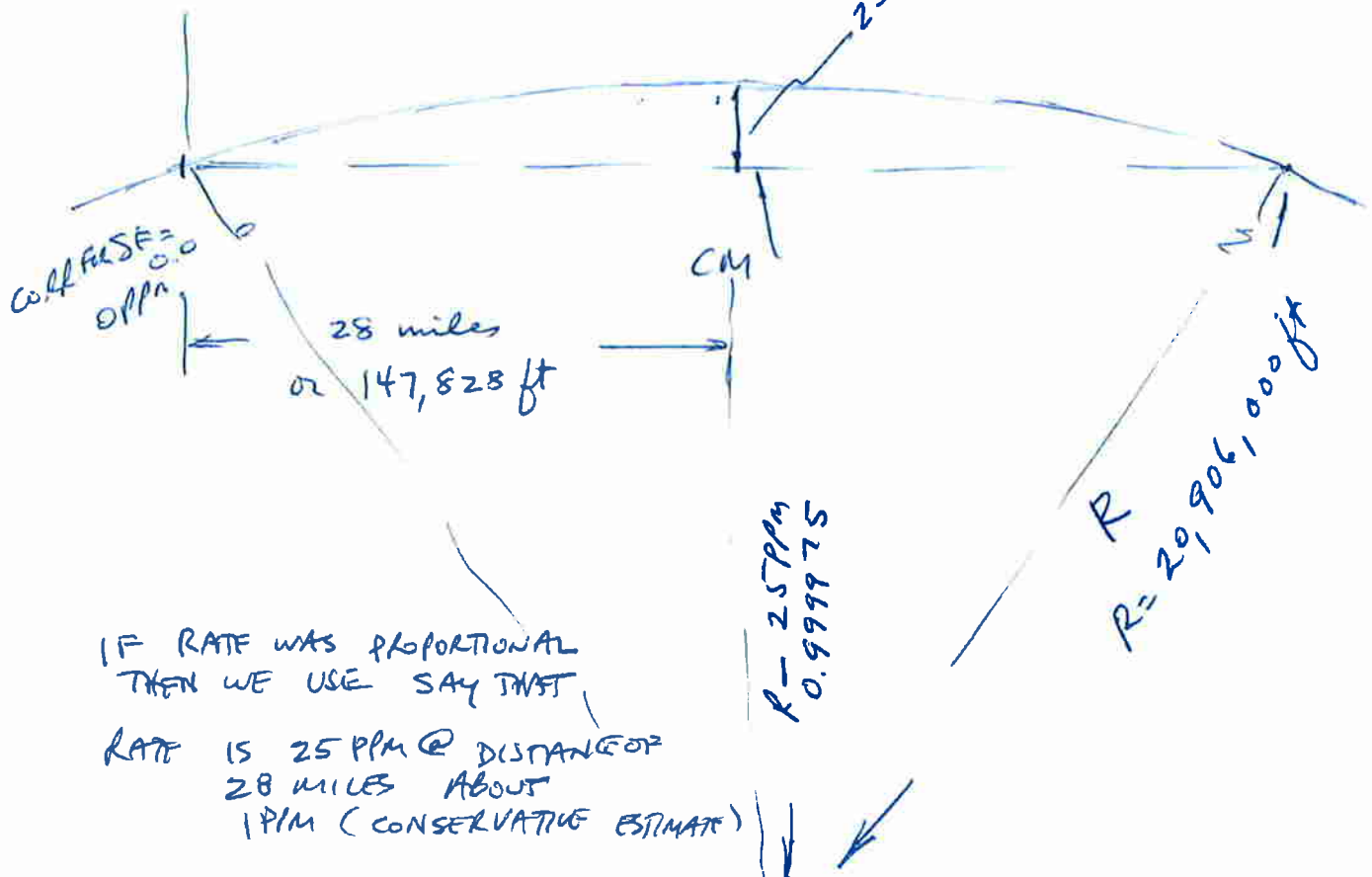
JOB _____ PREPARED BY _____ DATE _____

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SUBJECT _____

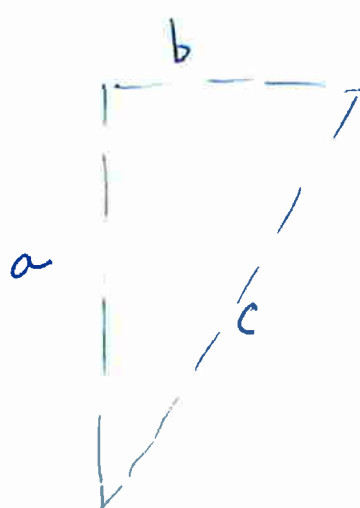
1927 NAD

Calculation
1/40,000 of 0.000025
(25 PPM)



IF RATE WAS PROPORTIONAL THEN WE USE SAY THAT

RATE IS 25 PPM @ DISTANCE OF 28 MILES ABOUT 1 PPM (CONSERVATIVE ESTIMATE)



$$a = R - 25 \text{ PPM} = 0.999975$$

$$c = R = 1,000,000$$

$$b = \sqrt{c^2 - a^2}$$

$$= \sqrt{1 - 0.999975^2} = \sqrt{1 - 0.999950}$$

$$b = \sqrt{-0.000050} = 0.00707106$$

$$b = 147,828 \text{ FT} \approx 27.9976$$

use 28 miles

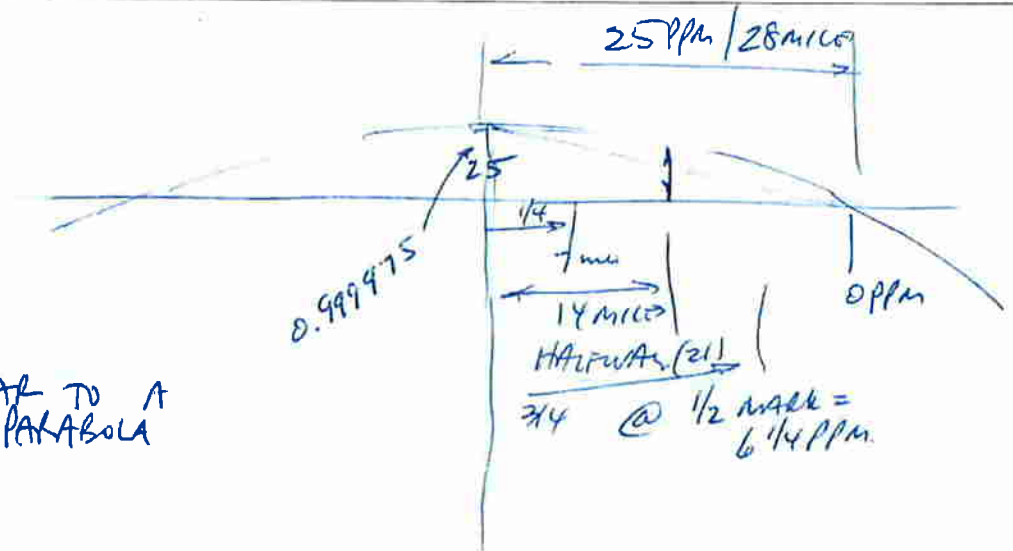


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SIMILAR TO A PARABOLA

$$14 \text{ miles } \left(\frac{1}{2}\right)^2 \times 25 \text{ ppm} = 6.25 \text{ ppm}$$

$$25 - 6 = 19 \text{ ppm} = 0.999981$$

$$7 \text{ miles } \left(\frac{1}{4}\right)^2 \times 25 = 1.562$$

$$25 - 2 = 23 \text{ ppm} = 0.999977$$

$$21 \text{ miles } \left(\frac{3}{4}\right)^2 \times 25 = 14.06 \text{ ppm}$$

$$25 - 14 = 11 \text{ ppm} = 0.999989$$

$$28 \text{ miles } \left(\frac{1}{1}\right)^2 \times 25 = 25 \text{ ppm}$$

$$25 - 25 = 0 \text{ ppm} = 0.0$$

RATE 0 MILES 25 PPM

RATE — CORRECTION 2 PPM / 7 MILES = $\frac{2 \text{ PPM}}{36,960} = \frac{0.054 \text{ PPM}}{\text{Per } 1000 \text{ ft.}}$

RATE @ 7 MILES 23 PPM

Rate = 6 PPM / 7 MILES = $\frac{6 \text{ PPM}}{36,960} = 0.162 \text{ PPM} / 1000 \text{ ft}$

Rate @ 14 MILES 19 PPM

Rate = 8 PPM / 7 MILES = $\frac{8 \text{ PPM}}{36,960} = 0.216 \text{ PPM} / 1000 \text{ ft}$

Rate @ 21 MILES 11 PPM

$\frac{11 \text{ PPM}}{36,960} = 0.2976 \text{ PPM} / 1000 \text{ ft}$

Rate @ 28 MILES 0 PPM

Compare to 25 PPM $\frac{25 \text{ PPM}}{28 \text{ MILES}} = 0.893 \text{ PPM} / 1000 \text{ ft}$