

Norwest Surveying Services, Inc.
Professional Land Surveyors & Land Planners
Serving Northwest Illinois & Eastern Iowa Since 1974

Established 1974
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March 19, 2012

Road Map Ministries

P.O. Box 140
Carlinville, IL 62626

Re: Antennae Verification - Deer Grove, Il.

Attn: Joe Rother

Dear Mr. Rother:

Per your instruction we visited the site located approximately one (1) mile East of Deer Grove, Illinois on March 16, 2012 and performed the field work necessary to determine the azimuth of the new directional antennae located on the existing radio transmission tower. The relative azimuths are listed below.

	Reported Az	Grid Az	Geodetic (True) Az
NW Guy Leg	317 °±	315°33'35"	315°13'52"
New Antennae	257°	256°29'12"	256°09'12"

The "Reported Azimuth" is what we were given by the client for the described object.

The "Grid Azimuth" was determined by GPS Location based on the Illinois State Plane Coordinate System - West Zone. A "Least Squares" Localization on seven (7) local USGS Bluebooked Stations was utilized for the reference. This reference was verified by readings from the "Illinois State Toll-way GPS Network".

The "Geodetic Azimuth" or "True Azimuth" was calculated from the "Grid Azimuth" utilizing this formula:

$$\alpha'' = (\Lambda\gamma) \text{ sine } \phi^\circ$$

where:

α'' = the mapping angle convergence expressed in seconds of arc

$\Lambda\gamma$ = the longitudinal difference, expressed in seconds of arc, between the central meridian (90°10'W) and the subject point (Tower).

ϕ° = the latitude of the point (Tower) expressed in decimal degrees.

It should be noted that the base line used to determine the azimuth of the antennae was only about two (2) feet in length. One (1) degree of rotation would result in less than 1/2" displacement at one end of the antennae.

SURVEYOR'S CERTIFICATE

I hereby certify that the information provided hereon is a true and correct representation of the field work & calculations completed by me, and/or under my direct supervision, on March 16, 2012.

Dated this 19th day of March 2012 CE



William E. Holt
Illinois Professional Land Surveyor
No. 35-2584
License Renews November 30, 2012

