

NEW COORDINATE ADJUSTMENT FOR MARYLAND/DELAWARE

The National Geodetic Survey (NGS) has recently completed the final adjustment of the Maryland/Delaware High Precision GPS Network (HPGN). Consisting of 85 stations, 61 new and 24 existing geodetic control stations spaced at approximately 30 kilometer (19 mile) intervals (Figure 1), the network was observed to B-Order (1:1,000,000) specifications as defined by the Federal Geodetic Control Committee (FGCC).

Project coordination and development was directed by Ralph Poust, NGS Geodetic Advisor to Maryland, with the assistance of the Maryland State Highway Administration (MDSHA), and the Delaware Department of Transportation. Field operations were conducted between October, 1990 and January, 1991, by NGS/MDSHA surveyors using Trimble 4000SST dual frequency GPS receivers. Most observations far exceeded the 1:1,000,000 proportional accuracy required for the adjustment. A majority of lines exceed 1:10,000,000!

In addition to adjusting the HPGN, all existing horizontal control in both states was readjusted to provide consistency between the HPGN and the conventional network. The readjustment extended into the bordering states to the extent required to maintain consistency of the National Geodetic Reference System. The new coordinate values are referred to as North American Datum of 1983, Adjustment of 1991, and are designated NAD 83 (1991). This designation is necessary to distinguish between the original NAD 83 Adjustment of 1986, or NAD 83 (1986). Coordinate values should be properly labeled to eliminate confusion. Positional changes due to the network upgrade vary from approximately 0.4 meter (1.2 feet) west of the Chesapeake Bay, to 0.9 meter (2.8 feet) on the Eastern Shore and Delaware (Figure 2).

Orthometric heights determined by leveling during the survey are currently referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29) as the new North American Vertical Datum of 1988 (NAVD 88) values were not available during the adjustment. Accuracy of ellipsoidal heights determined by the GPS observations are less than third-order, however, NGS and MDSHA provided second-order leveling ties to all but one GPS station. The leveling data has been received by NGS and is currently being reviewed for adjustment to both the NGVD 29 and NAVD 88.

All GPS surveys performed prior to this readjustment, and not submitted to NGS should be readjusted to maintain consistency with the NGRS. Lesser order survey work can be transformed from

NAD 83 (1986) to NAD 83 (1991) using a new version (2.10) of the NADCON software supplied by NGS with special transformation grids for the Maryland/Delaware HPGN. The transformation grids should be available by the end of May, 1992. Updated control information, and the NADCON software can be obtained from the NGS Information Center, 301-443-8684.

Questions concerning the HPGN and state-wide readjustment should be directed either to Ralph Poust, 410-333-1240, or Dave Doyle, 301-443-8684.