

DENR Administrative Order
No. 22
June 30, 1994

SUBJECT : Implementing Guidelines in the Adoption of the Philippine Reference System 1992 (PRS 92) for Land Surveys in the Philippines.

Pursuant to Executive Order No. 192 (1987) and Executive Order No. 45 (1992) ("Adopting the Philippine Reference System of 1992 as the Standard Reference System for Surveys in the Philippines"), the following guidelines are hereby issued for the guidance of and compliance by all concerned.

Sec. 1 Policy and Objectives. It shall be the policy of the state to accelerate the inventory, surveys and classification of lands using appropriate technology. In view of the above, the new geodetic control network known as the Philippine Reference System 1992 (PRS 92) is hereby adopted as the standard reference for all surveying and mapping activities in the country.

Sec. 2. Use of PRS-92. The use of the PRS 92 shall be required in the following surveys inaugurated in 1994 after the effectivity of this Order and thereafter:

- 2.1 The geodetic control network densification of control points in the country;
- 2.2 All cadastral, public land subdivision, group settlement subdivision, integrated social forestry (ISF), delimitation surveys of classified forest land, reservation, parks and protected areas, and political boundary surveys,
- 2.3 Isolated surveys of large tracts of land, 25 hectares and larger, mineral land surveys;
- 2.4 Isolated surveys covering lots or portions of lots of previously approved surveys based on the Philippine Plane Coordinate - Philippine Reference System 1992 (PPCS/PRS 92).

A certified geodetic record of the nearby available GPS stations in PRS-92, shall be secured from the Coast and Geodetic Surveys Department (CGSD) of the National Mapping and Resource Information Authority (NAMRIA).

However, if only one GPS station is available in the area, another station shall be established by the National Mapping and Resource Information Authority (NAMRIA) with corresponding funding for direction orientation. The new survey shall be tied and oriented to this pair of GPS/PRS-92 reference points by traverse triangulation or trilateration of precision(s) specified in this Order. The observed data shall be computed and adjusted using least squares adjustments. The certified geodetic record of the PRS-92 reference points used in the new survey shall form part of the survey returns.

In case there are no PRS-92 reference points, CGSD/NAMRIA shall be requested to establish and observe at least a pair of intervisible reference monuments within or near the area pursuant to Sections 486-487 of the Manual of Land Surveys of the Philippines (MLSP) and in accordance with this Order. These PRS-92 reference points shall be part of the traverse of the new survey.

The pair of PRS-92 reference points to be established shall be intervisible for azimuth orientation and position determination. In converting geographic positions based on PRS-92 to the Philippine Plane Coordinate System-Philippine Transverse Mercator (PPCS-PTM) grid coordinates and vice-versa, the same formulae and tables in Technical Bulletin No. 26 shall continue to be used.

All surveys using the geographic or grid coordinates in PRS-92 shall be indicated as such in the survey returns and the descriptions "Zone No., PPCS-PTM/PRS-92; bearing GRID" shall be entered in the corresponding line in the survey plan.

Sec. 3 Optional Use of PRS-92 during transition period. The use of PRS-92 may be optional in the following surveys during the transition period (1993-2000)

3.1 Isolated surveys of less than 25 hectares and located beyond five kilometers from the nearest existing GPS station in PRS-92. Such surveys may continue to be tied to nearby reference point in the Local Plane

Coordinate System (LCPS) or in the Philippine Plane Coordinate System-Transverse Mercator (PPCS-TM) or to established geodetic triangulation stations still in the old geographic coordinates.

- 3.2 Subdivision or consolidation-subdivision of previously approved surveys which are not yet integrated in PPCS/PRS-92 shall continue to be in the Local Plane Coordinate System (LCPS) or Philippine Plan Coordinate System (PPCS) of the previous survey; Provided, that all old surveys shall be integrated to PRS-92 until the year 2000 when the use of PRS-92 in all surveys shall be mandatory.
- 3.3 A certification as to the nearest reference point (BLIM, PBM, CBM, MBM, BBM, Coast and Geodetic Survey Triangulation stations) shall be secured from the NAMRIA, Lands Management Bureau or Lands Management Sectors which shall form part of the survey returns.

Sec. 4 Specification of Surveys. In order that all surveys shall be integrated to PRS-92, all subsequent interconnections must be surveyed with the following specifications:

- 4.1 The Position Accuracy shall be:

1st Order - 10 parts per million - 1/100,000 - 1 cm/km
2nd Order - 20 parts per million - 1/50,000 - 2 cm/km
3rd Order - 50 parts per million - 1/20,000 - 5 cm/km
4th Order - 100 parts per million - 1/10,000 - 10 cm/km

Vertical Accuracy

2nd Order - 8.4 mm. times square root of the distance
3rd Order - 12.0 mm. times square root of the distance

- 4.2 Accuracy specifications for densification and connection surveys.

- 4.2.1 The densification of the first order PRS-92 National Network shall be on 2nd and 3rd Order accuracy. CGSD/NAMRIA is responsible for the establishment of 2nd and 3rd Order control stations throughout the country.

- 4.2.2 The project controls of cadastral surveys shall be at least 3rd Order accuracy.
- 4.2.3 Political boundary surveys shall be at least 4th Order but preferably 3rd Order accuracy.
- 4.2.4 Delimitation of Integrated Social Forestry Projects, relocation or delimitation surveys of national parks and other protected areas, perimeter survey or classified forests including its buffer zones, reservations, resettlement projects, and mineral land surveys shall be at least 4th Order accuracy.
- 4.2.5 In the establishment of geodetic networks, connections to PRS-92 must always be made to a network that is of higher accuracy than the one to be established.

Sec. 5 Establishment, Markings and Numbering of Stations.

GPS stations in PRS-92 may be established by authorized geodetic engineers of government agencies or by duly accredited geodetic engineering professionals, provided the agency or professional is capable of densifying PRS-92, and provided further that their Global Positioning System (GPS) receivers are duly registered with and calibrated by CGSD/NAMRIA.

The new GPS station in PRS-92 shall be (established) monumented with sub-surface marking and the reference point numbering (in accordance with the specifications set by CGSD/NAMRIA) shall follow those established in the provinces by CGSD/NAMRIA, Provided, that the markings of BLIM, CBM, PBM, MBM or BBMs when they are directly observed in PRS-92 reference point number shall be added on the marker. For new stations of fourth order accuracy the Lands Management Bureau/Land Management Sector and the NAMRIA may design their own set of numbering. The Land Management Bureau/Land Management Sector shall forward whatever system they adopt to CGSD/NAMRIA for completing the central data bank.

Sec. 6 GPS Survey Pre/Post Requirements.

Geodetic Engineers of both the government and the private sector shall submit the following to CGSD/NAMRIA for the evaluation of survey results using GPS receivers:

- 6.1 Type of GPS receivers
- 6.2 Technique/survey practices to be utilized in the survey
- 6.3 Reduction techniques and computer programs for adjustment
- 6.4 Network design
- 6.5 Results of a minimally constrained least squares network adjustment computed on the ellipsoid associated with the datum on which the observations were acquired.
- 6.6 Number of existing horizontal control points to be occupied
- 6.7 Time per occupation as a function of satellite geometry
- 6.8 Number of occupation per site
- 6.9 Number of repeated baselines
- 6.10 Cutoff elevation
- 6.11 Antenna setup specifications
- 6.12 Number of receivers
- 6.13 Ephemeris source and age

All other cases not covered in any of the foregoing shall be subject to special instructions to be issued by the Secretary or his authorized representative.

Sec. 7 Repealing Clause. All other orders, rules and regulations inconsistent herewith are hereby repealed and/or amended accordingly.

Sec. 8 Effectivity. This Order takes effect fifteen (15) days after its publication in a newspaper of general circulation.

ANGEL C. ALCALA
Secretary