



**REGULATION OF GEOMATIC
(WORK INSTRUCTION)**

PART III – CADASTRAL

**SURVEY DEPARTMENT
MINISTRY OF DEVELOPMENT
BRUNEI DARUSSALAM**

Contents

- 3. PART III – CADASTRAL 3
 - 3.1. TYPES OF SURVEYS..... 3
 - 3.2. FIELD DATA 3
 - 3.3. ORIGINS OF SURVEY 4
 - 3.4. BEARINGS..... 5
 - 3.5. CHECK BEARINGS 6
 - 3.6. DISTANCES 6
 - 3.7. COMPUTATION AND CLOSURE..... 7
 - 3.8. BOUNDARY MARKS..... 8
 - 3.9. STRATA TITLE SURVEY..... 9

3. PART III – CADASTRAL

3.1. TYPES OF SURVEYS

This instruction is applicable to all types of Surveys which relate to land titles including;

- 3.1.1. Subdivision or Consolidation of Land - SD
- 3.1.2. Redefinition Surveys - BR
- 3.1.3. Strata Title Surveys - ST
- 3.1.4. Gazette – GR
- 3.1.5. Restricted Gazette Surveys – GT
- 3.1.6. Land Title Surveys - PT
- 3.1.7. Acquisition Surveys –AQ
- 3.1.8. Land Application Surveys – LA
- 3.1.9. Temporary Ownership Of Land Surveys – TL
- 3.1.10. Miscelineaous Surveys – MS

3.2. FIELD DATA

3.2.1. Field Notes

The following provision shall apply to field notes.

- (1) Original field notes shall be recorded in a Survey Department field book and/or approved digital format.
- (2) All field books/field data are the property of the Government of Brunei Darussalam and shall be retained as official records.
- (3) The system of recording field observations in the Field Book and /or approved digital format shall be the same as that adopted by the Survey Department.
- (4) Field data shall be neatly and clearly recorded in permanent black or blue black ink such a way that another surveyor or draughts person may draw a correct plan of the survey.
- (5) The field data shall contain a record of all observations and measurements made by the surveyor and of the marks found or placed by the surveyor for the purposes of these Instructions. The field notes/data shall also show all location features made in accordance with good survey practice.
- (6) No entry shall be altered, defaced or obliterated. Every amendment made by the surveyor shall be clearly written and erroneous entries shall be clearly crossed out, and initialled.

- (7) The first page of the field notes of each survey shall show the S.P. number, description of the survey, particulars of the Lots, Kampong, Mukim, District, Standard Survey Sheet or such other reference as shall sufficiently identify the land surveyed, and the date of commencement and completion of the survey. The names or signatures of the surveyor, checker and the instrument used and its calibration shall also be stated. Whereby updated certificates of calibration should be attached by Licensed Surveyors.
- (8) Clear diagrams shall be drawn to make the measurements recorded in the field book readily interpretable, and shall show a North point and shall be clearly referenced with respect to other diagrams.
- (9) In diagrams, boundary lines shall be represented by solid lines, traverse lines and shooting lines and offsets shall be represented by interrupted lines. The boundaries of the under survey shall be edged in red.
- (10) The words " **Adopted Bearing** " and " **Bearing Closed** " shall be entered both in the field book and the Survey Plan reference against the appropriate bearings on the observation pages and on the relevant diagrams.
- (11) All stations shall be numbered and no station number shall be used more than once in each survey. The abbreviations, symbols and conventional sign in accordance with approved draughting Instructions of the Survey Department (refer Section B) shall be used in the field notes and in the plans.
- (12) Each field book shall contain not more than (1) one S.P. Except for the S.P.'s which Lots are adjacent to each other and the surveys are carried out on the same time by the same surveyor.

3.2.2 Digital Field Data

The following provision shall apply to digital field data.

- 3.2.2.1 Digital field data and printed output shall be supplied to the Surveyor General (SG).

3.3 ORIGINS OF SURVEY

The origin of coordinates and bearings shall be in terms of G.R.S.O. grid and in accordance with the following;

3.3.1 Origins of Coordinates and Bearings

3.3.1.1 Types of Origins

- (i) Trigonometrical stations.
- (ii) Standard or first class traverses.
- (iii) Second class surveys approved by the Surveyor General (SG).
- (iv) GNSS stations approved by the Surveyor General (SG).
- (v) Solar Azimuth
- (vi) Any other surveys which the Surveyor General (SG) at his discretion, accepts as suitable.

3.3.1.2 Lines used for " Adopted Bearing " and " Bearing Closed " shall be not less than 50 metre long.

3.3.1.3 Alternative Origin

If it is impracticable to use the methods mentioned above, the origin of bearings may be obtained from at least two independent stellar and/or solar observation.

3.3.1.4 The reliability of any two marks for the purposes of this Instruction shall be approved by testing their agreement with a third approved mark, subject to a permissible angular closing error of not more than 0.03 metre.

3.3.2 Methods of Survey

Subject to other provisions of this Instruction, the following methods of survey shall be acceptable.

3.3.2.1 By direct traverse, with no distance less than 30 metres unless field procedures ensure orientation remains within the precision specified in these Instructions or;

3.3.2.2 By well-conditioned connecting triangle; or

3.3.2.3 By resection from at least four favourably situated and reliable control survey stations.

3.4 BEARINGS

3.4.1 Surveyors undertaking title surveys shall make two independent angular observations in sexagesimal system with a theodolite or electronic theodolite (total stations).

3.4.2 The permissible angular closing error for title surveys is fifteen seconds (15'') of arc per station with a maximum accumulation of 2 minutes and 30 seconds of arc (2' 30'').

3.4.3 For the purpose of computation and recording on plans shall use deduced bearings shall be rounded off as follows: -

Length of Line	Rounded off to the nearest
Up to 40 m.	0° 01'
> 40 m. - 200 m.	0° 00' 20"
Over 200 m.	0° 00' 10"

3.4.4 Deduced bearings are to be shown in the field books and on the diagrams.

3.4.5 Any survey bearing and angle measuring equipment shall be calibrated against the Survey Department standards:

3.4.5.1 Before being brought into use when new or after repair.

3.4.5.2 Every twelve months/annually.

3.4.5.3 At the request of the Surveyor General (JUA).

3.5 CHECK BEARINGS

3.5.1 Check bearings shall be observed at intervals of not more than 20 stations or at station not more than 2000m apart by the traverse, whichever is least.

3.5.2 Check bearings shall consist of:

3.5.2.1 Bearings observed to stations from any well-established points;

3.5.2.2 Stellar or solar azimuths;

3.5.2.3 Any approved GNSS Stations

3.6 DISTANCES

3.6.1 All distances shall be measured in metres to three (3) decimal places. For the purposes of calculation all distances shall be rounded to 2 decimal places and shown on the plans to 2 decimal places.

3.6.2 Surveys shall ensure that all distances shown in field books are in terms of the official standard of length, calibration of other measuring equipment shall be recorded on the field book cover.

3.6.3 At least two separate and complete measurements shall be made from both ends of each traverse line and the difference in length between measurement shall not exceed +/- (10mm+ 15p.p.m). If this agreement is not reached then additional measurements shall be made.

3.6.4 Distances shall be measured with calibrated electromagnetic equipment capable of accuracy +/- (5mm+ 5p.p.m)

- 3.6.5 The necessary corrections, for calibration, atmospheric conditions, slope, height above sea level, and scale factor shall be applied where applicable, to the measured distances and the horizontal distance at sea level and grid distances shown in the field notes.

3.7 COMPUTATION AND CLOSURE

- 3.7.1 All traverses shall be computed and coordinated in terms of the origin of the Geocentric Rectified Skew Orthomorphic Grid on traverse sheets.
- 3.7.2 If it is not practicable for the surveyor to express his survey in terms of the Geocentric Rectified Skew Orthomorphic Grid, the Surveyor General (SG), at his discretion, may accept surveys with provisional, scaled or assumed coordinates.
- 3.7.3 The closure of the traverse on to well established marks, or initial point of the survey after completing the traverse shall not below the limits of 1: 4000 or Q-factor 0.008. On short or minor circuits misclosures of not more than 0.03m., shall be permitted.
- 3.7.4 Where the traverse circuit comprises in whole or in part traverse or boundary lines adopted from prior surveys, the closing limits prescribed in subclause 3.7.3 Of this technical instruction may be increased at the discretion of the Surveyor General (SG).
- 3.7.5 The traverse closing error shall be eliminated by applying any approved systematic method to distribute the closing error and shall be shown on the traverse sheet.
- 3.7.6 Before any attempt is made to replace missing or disturbed marks, the relationship between the bearings and the distances adopted for the original survey and those adopted for the new survey, shall be determined to establish the most probable positions of the marks.
- 3.7.7 A hanging or shooting traverse shall generally be avoided where applicable and not consist of more than one line. Independent measurements to check bearing and distance shall be recorded in the field books.
- 3.7.8 Bearings and distances of the boundaries which have not been traversed shall be calculated.
- 3.7.9** The areas of the lot and the access reserve are to be calculated, and shown in the diagram pages of the field book. The area of the surveyed lot shall be within the tolerance +-10% of the actual area.
- 3.7.10 The output of the results of the Survey Computation such as coordinates, shall be in the standard format accepted by the Survey Department.

3.8 BOUNDARY MARKS

3.8.1 Boundary marks shall be:

3.8.1.1 Provided by Survey Department Cylindrical reinforced concrete marks, numbered and not less than 60 cms long with a diameter of not less than 8 cms. driven or set to finish not less than 5cm above ground level.

3.8.1.2 Any other marks approved by the Surveyor General (SG).

3.8.2 Where the presence of rock, stone, concrete or other permanent material or structure makes it impossible to use either of the boundary marks as specified in subclause 3.8.1 of this Instruction the following shall be used:

3.8.2.1 A metal rod or pipe or plastic of appropriate length of at least 1 cm. internal diameter and driven or set to finish not more than 5 cm. above ground level.

3.8.2.2 Metal or plastic marks of a type approved by the Surveyor General (SG), grouted if necessary into the base material to ensure stability. The height of mark above ground level shall be shown in the field notes.

3.8.2.3 Any other marks approved by the Surveyor General (SG).

3.8.3 If a boundary corner or boundary line falls on a permanent structure or other obstacle in such a manner that it is not possible to use any of the marks prescribed in the Instruction. , the exact position of the structure or obstacle shall be defined by survey. The relationship between the structure or obstacle and the boundary corner or boundary line shall be clearly shown on the plan of the survey.

3.8.4 If a boundary corner cannot be marked by reason of watercourse, structure, topography, vegetation, etc., line marks shall be placed along all boundaries as near as possible to the boundary corner. The relationship between such line marks and the boundary corner shall be clearly shown on the plan of the survey.

3.8.5 Details of physical features such as; fences, walls, hedges, etc., along boundary lines shall be noted and shown in the field notes and on the plan of the survey.

3.8.6 Permanence and stability shall be the main considerations in the marking of any boundary, and where necessary, the length of any mark shall be increased accordingly.

3.8.7 Boundaries shall be marked at every corner in accordance with the Instruction in subclause 3.8.2-3.8.4 of this Instruction.

- 3.8.8 Boundary lines shall be generally measured directly.
- 3.8.9 In urban surveys where the measurement of every boundary is not necessarily sufficient, boundaries shall be measured to ensure the accuracy of computed boundaries.
- 3.8.10 Boundary lines shall be cleared where necessary and distinctly marked at intervals generally not exceeding 300m, which may be varied to suit the topography of the Country. Advantage shall be taken of the most prominent and favourable positions on the line for the markings so that marks are intervisible.
- 3.8.11 In area where complete measurement of the boundary is not necessary, it shall be subjected to the approval of the Surveyor General (SG). Lines shall be cut and line marks placed at the distance of not more than 100m from the boundary corners at each end so that the boundary may be readily ranged.
- 3.8.12 Every survey mark defining an angle in a boundary shall be connected by traverse to a control traverse or witness mark.
- 3.8.13 No invisible survey mark shall be itself a witness mark.
- 3.8.14 Curved boundaries are not acceptable.

3.9 STRATA TITLE SURVEY

- 3.9.1 Field Work
- 3.9.2 Unit Boundaries.
- 3.9.3 Numbering of Buildings and Units.
- 3.9.4 Preparation of Strata Plan