



***REGULATION OF GEOMATIC
(WORK INSTRUCTION)***

PART 8 – SURVEY MARKS

***SURVEY DEPARTMENT
MINISTRY OF DEVELOPMENT
BRUNEI DARUSSALAM***

CONTENTS

8. SURVEY MARKS	3
8.1. STANDARD TRAVERSE MARKS	3
8.2. FIRST CLASS TRAVERSE MARKS	3
8.3. GPS MARKS	3
8.4. BENCH MARKS	4
8.5. BOUNDARY MARKS	4
8.6. TRAVERSE AND WITNESS MARKS	6
8.7. MARK DIMENSIONS	7
8.8. MARK PHOTOGRAPHS	11

8. SURVEY MARKS

8.1. STANDARD TRAVERSE MARKS

Standard Traverse Marks shall be as follows;

- 8.1.1. Standard marks shall be constructed of galvanised pipes of length not less than 100cm and internal diameter of not less than 2.5 cm.
- 8.1.2. The top of the pipe shall be secured below ground level by a concrete collar not less than 50cm square and 15cm thick.
- 8.1.3. The centre of the pipe shall be marked by a small non-ferrous nail set in concrete. The number shall be marked in the concrete collar.
- 8.1.4. For ease of location, numbered reference stones shall be placed not less than 50cm but not more than 100 cm from the standard marks

8.2. FIRST CLASS TRAVERSE MARKS

First class traverse marks shall be:-

- 8.2.1. A galvanised pipe of length not less than 60cm and internal diameter of not less than 2.5 cm.
- 8.2.2. The top of the pipe shall be secured below ground level by a concrete collar not less than 30cm square and 10cm thick.
- 8.2.3. The centre of the pipe shall be marked by a small non-ferrous or brass nail set in concrete. The numbers shall be marked in the concrete collar.
- 8.2.4. A metal or plastic mark of a type approved by the JUA, securely set or grouted into rock or into a permanent structure.
- 8.2.5. Line marks shall be of permanent material, usually either an iron pipe or an iron spike, and shall usually be buried below ground level.
- 8.2.6. Pickets or other temporary marks shall not be used in any control survey.
- 8.2.7. For ease of location numbered reference stones shall be placed not less than 50cm but not more than 100cm from the first class marks.

8.3. GNSS MARKS

GNSS fixed stations shall be as follows;

- 8.3.1. Constructed of galvanised pipes not less than 60cm.
- 8.3.2. The top shall be secured below ground level, a concrete collar not less than 30cm square and 30cm thick.
- 8.3.3. The centre of the pipe shall be marked by brass nail set in the concrete
- 8.3.4. The numbers shall be marked in the concrete collar.
- 8.3.5. Each survey station shall carry individual number. This will ensure that, where a station has been destroyed and subsequently replaced by a new station in a proximately the same location, misidentification does not occur.

8.3.6. Any other marks approved by the JUA.

8.4. BENCHMARKS

Benchmarks shall be constructed as follows:

- 8.4.1. Excavation of 60X60X100 cm foundation.
- 8.4.2. Galvanised pipe to be driven with minimum length of 2 metres and diameter between 10 cm (4in) and 16 cm (6in).
- 8.4.3. The top of the GI pipe shall be fitted with a 3.2 cm (1¼ in) diameter copper pipe with maximum length of 30 cm and fabricated to hold in position the bronze mark. This bronze mark will be provided by Survey Department.
- 8.4.4. The excavation area with the galvanised pipe to be filled and secured with concrete collar.
- 8.4.5. Above the ground level shall be concreted using the mould that will be provided by Survey Department.
- 8.4.6. On the top of the concrete shall be stamped with words "JABATAN UKUR" and the number of the station that assigned by Survey Department. Survey Department will provide the stamp. The words and the numbers shall be colour in red.
- 8.4.7. On the front side of the station a stainless steel plate shall be fabricated and installed with the words on the first line "HARTA BENDA KERAJAAN" and followed by on the second line with the words "SILAJAGAKESELAMATANNYA". The colour of this wordings shall be in red.
- 8.4.8. The finishing shall be plastered and colour with white using all weather paint. (See GDC01A).

8.5. BOUNDARY MARKS

8.5.1. Types of Marks

Boundary marks shall be:

8.5.1.1 Cylindrical reinforced concrete marks, numbered with a diameter of not less than 8 cm and concreted on top of PVC pipe of not less than 60 cm long with diameter of not less than 2.5 cm and driven or set to finish not less than 5 cm above ground level.

8.5.1.2 Where the presence of rock, stone, concrete or other permanent material or structure makes it impossible to use Standard Boundary Marks, the following shall be used:

(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.

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

8.5.2. Placement of Marks (under cadastral)

- (1) 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 this 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.
- (2) 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 corners shall be clearly shown on the plan of the survey.
- (3) 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.
- (4) 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.
- (5) Boundaries shall be marked at every corner in accordance with the Instruction with other clauses of these Instructions.
- (6) Boundary lines shall be generally measured directly.
- (7) Where the measurement of any boundary is not possible, sufficient observations shall be made to ensure the accuracy of computed boundaries.
- (8) 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. Advantages shall be taken of the most prominent and favourable positions on the line for the markings so that marks are inter-visible.

- (9) In area where complete measurement of the boundary is not necessary, subject to the approval of the Surveyor General, lines shall be cut and line marks placed not more than 100 m apart so that the boundary may be readily ranged.
- (10) Every survey mark defining an angle in a boundary shall be connected by traverse to a controlled traverse or witness mark.
- (11) No invisible survey mark shall be itself a witness mark.
- (12) Curved boundaries are not acceptable.
- (13) Where practicable, boundary marks should be placed in sequential order.

8.6. TRAVERSE AND WITNESS MARKS

8.6.1. Types of Marks

Traverse and witness marks shall be:-

- (1) Metal or plastic pipe not less than 1 cm. internal diameter and 50 cm long.
- (2) Iron spike not less than 1 cm. diameter and 30 cm long.
- (3) Metal or plastic mark of a type approved by the Surveyor General (SG), securely set or grouted into rock or into a permanent structure.
- (4) Other permanent and definite marks which are accepted by the Surveyor General.
- (5) Wooden pickets or other temporary marks are not to be used for traverse, on line or witness marks

8.6.2. Placement of Marks

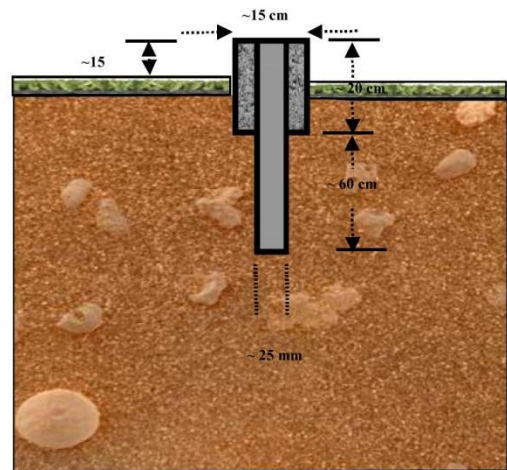
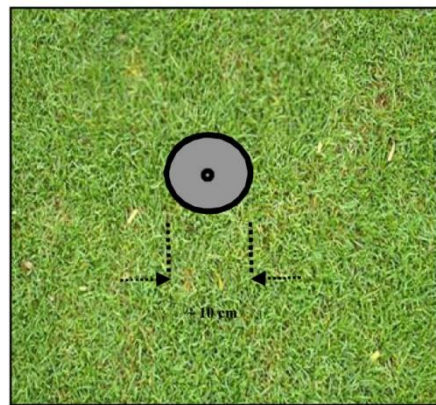
- (1) Care shall be taken when placing marks where there is a danger striking underground services.
- (2) All traverse and witness marks shall be placed in positions that are as safe as possible from foreseeable disturbance and shall normally be driven or set not less than 20 cm. below ground level. Where there is a risk of disturbance or destruction by any development or works, or by vandalism, marks shall be driven or set as deep as necessary for reasonable

preservation. The depth of fall mark shall be shown in the field notes. Where necessary the length of mark shall be increased to ensure permanence and stability.

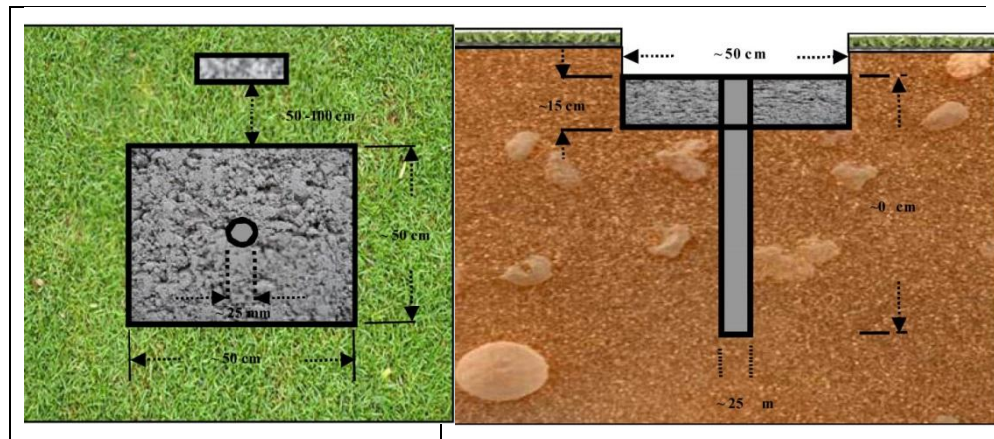
- (3) Traverse and witness marks shall be located and driven or set so that they cannot be mistaken for boundary marks.
- (4) Traverse lines shall, where practicable, be located such that they will not be obstructed by future structures or development.

8.7. MARK DIMENSIONS

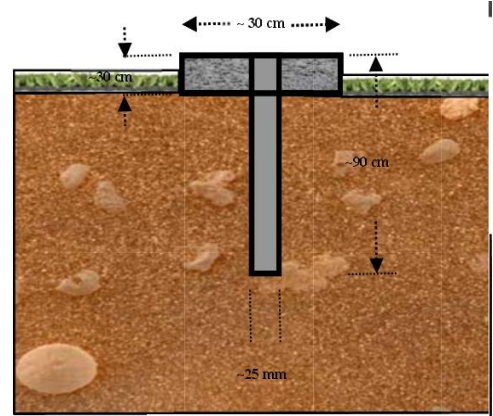
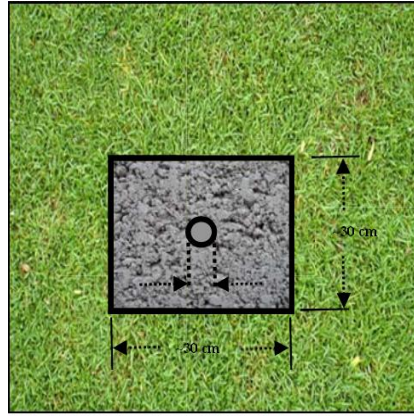
8.7.1. Standard Traverse Marks



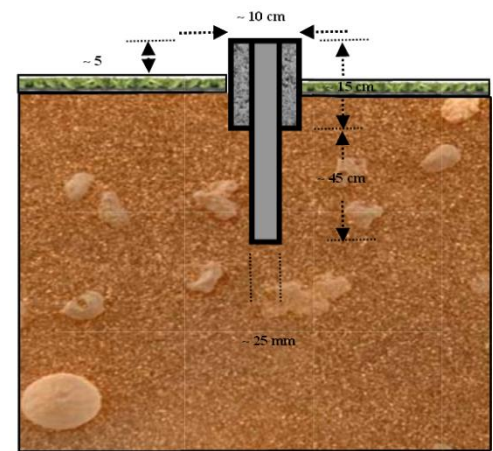
8.7.2. First Class Traverse Marks



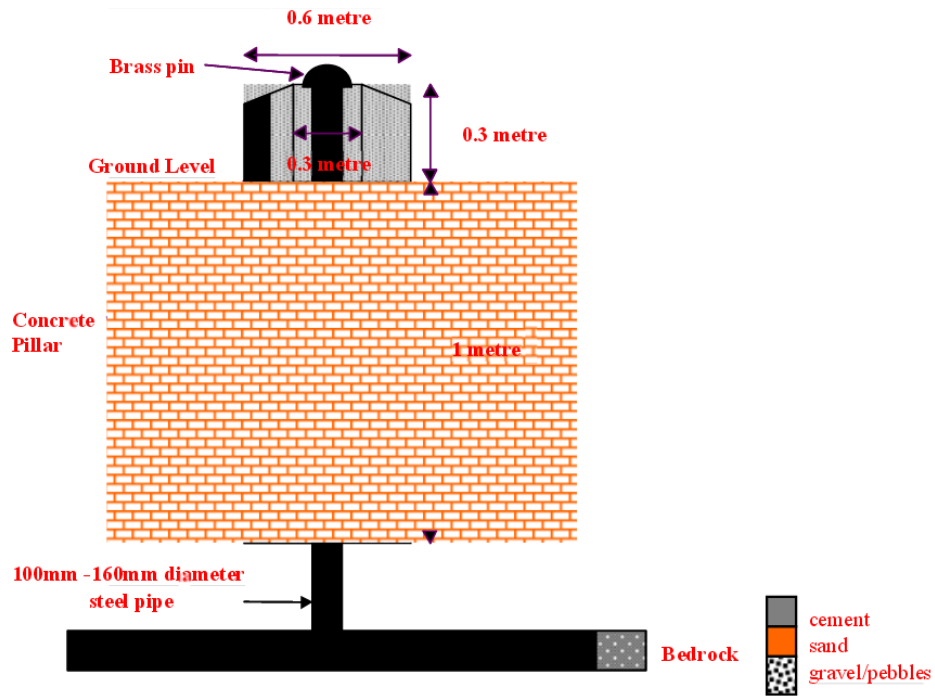
8.7.3. GNSS Fixed Stations



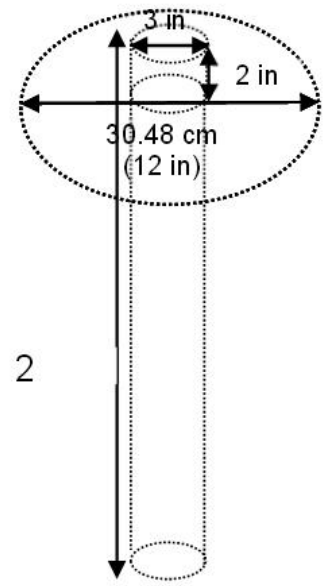
8.7.4. Boundary Marks



8.7.5. Bench Marks



8.7.6. OtherMarks
(1) InternationalBoundaryMark



8.8. MARK PHOTOGRAPHS

8.8.1. Standard Traverse Mark



8.8.2. First Class Traverse Mark



8.8.3. GNSSStation



8.8.4. Bench Marks



(1) Boundary Marks



(2) Old BelianPeg(OBP)



(3) OldConcreteMark(OCM)



(4) OldConcreteMark(OCM)–Numbered



(5) NewConcretePipe(NCP)



(6) OldIronPipe(OIP)



(7) NewPlasticPipe(NPP)



(8) Nail



(9) Picket

