

**NORTHERN TERRITORY OF AUSTRALIA**  
**SURVEY PRACTICE DIRECTIONS 2003 – SURVEYS OUTSIDE**  
**COORDINATED SURVEY AREAS**

SURVEY PRACTICE DIRECTIONS 2003 – SURVEYS OUTSIDE  
COORDINATED SURVEY AREAS

PART 1 – PRELIMINARY

1. Title
2. Definitions
3. Supervision

PART 2 – SURVEY PRACTICE

4. Standardisation of instruments
5. Datum line
6. Isolated parcels
7. Connection to geodetic or coordinated survey marks

PART 3 – BEARINGS

8. Bearings
9. Astronomical observations

PART 4 – REDEFINITION OF BOUNDARIES

10. Excesses and deficiencies
11. Comparison with original
12. Re-marking

PART 5 – MARKING AND REFERENCING

*Division 1 – General*

13. Survey marks
14. Parcel numbers on survey marks
15. Unique numbering on long line surveys
16. Reference marks
17. Finders
18. Non-compliance with boundary marking

*Division 2 – Marking in urban areas*

- 19. Marking angles and bends
- 20. Intermediate marks
- 21. Reference marking

*Division 3 – Marking in rural areas*

- 22. Marking angles and bends
- 23. Intermediate marks
- 24. Parallels of latitude
- 25. Reference marking in rural areas
- 26. Boundary indicators

**PART 6 – ACCURACY OF SURVEYS**

- 27. Limiting error of closure
- 28. Angular closure

**PART 7 – FIELD NOTES, PLANS AND REPORTS**

- 29. Rounding off
- 30. Offsets to occupation
- 31. Field notes to be neat and complete
- 32. North point and certification of field notes
- 33. Copies of field notes
- 34. Calculation of areas
- 35. Recording of areas
- 36. Original plans
- 37. Compiled plans
- 38. Damaged plans
- 39. Survey reports
- 40. Non-compliance with directions

# NORTHERN TERRITORY OF AUSTRALIA

## Directions under *Licensed Surveyors Act*

The Surveyor Board of the Northern Territory of Australia, in pursuance of section 47 of the *Licensed Surveyors Act*, gives the following directions with respect to the practice to be followed by licensed surveyors in making land boundary surveys outside coordinated survey areas and preparing plans showing the results of those surveys.

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The common seal of the Surveyors Board of the Northern Territory of Australia is affixed in pursuance of a resolution of the Board authorising the seal to be affixed passed on \_\_\_\_\_ 2003.

Chairperson

Member

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**SURVEY PRACTICE DIRECTIONS 2003 – SURVEYS OUTSIDE  
COORDINATED SURVEY AREAS**

**PART 1 – PRELIMINARY**

**1. Title**

These Directions may be referred to as the Survey Practice Directions 2003 – Surveys Outside Coordinated Survey Areas.

**2. Definitions**

In these Directions, unless the contrary intention appears –

"coordinated survey mark" means a survey mark with coordinates that are officially recorded in the approved geodetic datum;

"GNSS" means equipment that operates in a global navigation satellite system;

"surveyor" means a surveyor licensed under the Act;

"true mid bearing" is the true bearing of a survey line at a point midway along the survey line.

**3. Supervision**

A surveyor who carries out a survey must ensure that he or she oversees and directs the survey work to ensure that the survey is carried out in accordance with these Directions.

**PART 2 – SURVEY PRACTICE**

**4. Standardisation of instruments**

(1) A surveyor must ensure that equipment used by the surveyor or by persons employed under the surveyor's supervision is correctly adjusted, correctly standardised and correctly calibrated before use.

(2) A surveyor must, every 12 months, verify distance-measuring equipment, including GNSS, against a standard acceptable to, and in a manner approved by, the Surveyor-General.

**5. Datum line**

(1) Subject to subclause (2), a surveyor is to ensure that a datum line, consisting of at least 3 original marks, is adopted for each survey.

(2) If the 3 original marks adopted for a survey are from an earlier survey, the surveyor must ensure that sufficient work is carried out to confirm that the marks are in their original purported positions or that they can be related to their original positions.

**6. Isolated parcels**

A surveyor must ensure that, where practicable, each parcel of land is connected by survey or calculation to some previously surveyed or calculated parcel corner.

**7. Connection to geodetic or coordinated survey marks**

A surveyor must, where practicable, ensure that the land being surveyed is connected to the nearest coordinated survey mark, by either direct measurement, well-conditioned bearings or GNSS observations.

**PART 3 – BEARINGS**

**8. Bearings**

- (1) A surveyor must ensure that bearings of the datum line are –
  - (a) taken from the datum survey either directly or by calculation from stated dimensions; or
  - (b) obtained from astronomical or GNSS observations.
- (2) A surveyor must ensure that bearings data from existing surveys is used.
- (3) A surveyor must ensure that true mid bearings are used in rural areas.

**9. Astronomical observations**

- (1) A surveyor must ensure that when a survey extends more than 10 km from the datum line, astronomical or GNSS observations for azimuth are made at intervals of not more than 10 km.
- (2) A surveyor must ensure that –
  - (a) the bearing of the datum line is used to obtain all other bearings; and
  - (b) all bearings are adjusted to the nearest 10 seconds.
- (3) If there is a conflict between bearings, the surveyor must show adopted and original bearings in his or her field notes.

## **PART 4 – REDEFINITION OF BOUNDARIES**

### **10. Excesses and deficiencies**

(1) If existing title boundaries are redefined by measurement by a surveyor or a person employed under the surveyor's supervision, the surveyor must, unless there are other considerations, ensure that an excess or deficiency in measurement is proportioned between the parcels of land to which the existing title boundaries relate.

(2) In proportioning a measurement under subclause (1), the surveyor must ensure that road widths are maintained and original Crown marks are given priority.

### **11. Comparison with original**

(1) If a surveyor or a person employed under the surveyor's supervision –

- (a) measures between marks from a previous survey; and
- (b) observes a measurement that differs from the previous measurement by an amount that, when compared with the original distance, exceeds the limiting error of closure set out in clause 27,

the surveyor must ensure that –

- (c) the measurement is confirmed by re-measuring the line; and
- (d) both results are recorded in the field book.

(2) If a surveyor or a person employed under the surveyor's supervision measures a line to be within the limiting error of closure set out in clause 27, the original distance must, if possible, be adopted.

### **12. Re-marking**

A surveyor must ensure that when a boundary is resurveyed, the boundary is marked in the same manner as a new boundary but does not require referencing.

## **PART 5 – MARKING AND REFERENCING**

### *Division 1 – General*

### **13. Survey marks**

(1) A surveyor must ensure that a survey mark is constructed of concrete, steel or hardwood or another material that will resist destruction by fire, decay and termites.

- (2) A surveyor must ensure that a survey mark is in the form of –
  - (a) a peg – being a white-painted, flat-topped mark not less than 50 mm square and 350 mm in length;
  - (b) a steel peg – being a white-painted, steel star dropper not less than 600 mm in length;
  - (c) a post – being a white-painted mark (that, if it is made of wood, is pointed on top), not less than 100 mm square and 750 mm long, sunk at least 450 mm into the ground;
  - (d) a witness mark – being a white-painted, steel star dropper, not less than 1600 mm long, driven not less than 400 mm into the ground; or
  - (e) another mark that is approved by the Board from time to time.

**14. Parcel numbers on survey marks**

- (1) A surveyor must ensure that a peg or post is clearly and durably marked with –
  - (a) the lot, portion or section number of the parcel being surveyed; and
  - (b) the lot, portion or section number of the adjoining parcels.
- (2) A surveyor must ensure that if a survey mark defines the boundary of a road, the letter "R" is used as a distinguishing mark.
- (3) A surveyor or a person employed under the surveyor's supervision may only mark –
  - (a) a post – by cutting the numbers into it or by stamping the numbers onto a metal tag of not less than 1 mm thickness and attaching the tag firmly to the post; or
  - (b) a peg – by stamping the numbers onto a metal tag of not less than 1 mm thickness and attaching the tag firmly to the peg.

**15. Unique numbering on long line surveys**

- (1) A surveyor must ensure that, on long line surveys, each peg, concrete block or post is clearly and durably marked with a unique, consecutive number.
- (2) A surveyor must ensure that the unique number on the survey mark is marked by –
  - (a) stamping the number onto the concrete block or the post; or

- (b) stamping the number onto a metal tag of not less than 1 mm thickness and attaching the tag firmly to the peg, the concrete block or the post or adjacent to the mark.

**16. Reference marks**

(1) A surveyor must ensure that a survey reference mark is in the form of –

- (a) a spike – being a steel or iron spike not less than 8 mm in diameter and 200 mm long, driven flush into a paved surface, if practicable, or driven not less than 150 mm below an unpaved surface;
- (b) a nail – being a broad-headed nail driven or set into concrete or another durable medium, but not placed in the natural surface of the ground;
- (c) a concrete block – being a plaque, spike, or steel peg, set in concrete, whether poured in situ or precast, which may be placed flush with or below the ground, depending on the nature of the surface;
- (d) a drill hole – being a hole not less than 5 mm in diameter and 10 mm deep, drilled into a kerb or other substantial concrete structure and with wings not less than 50 mm long cut on either side of the hole to indicate its position;
- (e) a tree – being a tree suitably blazed and marked with a broad arrow cut into the blaze, the head of the broad arrow being the reference mark; or
- (f) another mark approved by the Board from time to time.

(2) If all of the marks specified in subclause (1) are impracticable or unsuitable in a particular case, a surveyor may place or adopt marks of equivalent durability and stability.

**17. Finders**

(1) A surveyor must ensure that, at each peg or post in an urban area, a finder that is –

- (a) a white-painted fence spacer; or
- (b) a white-painted, 25 mm by 25 mm wooden stake not less than 900 mm long,

is driven firmly into the ground.

(2) A surveyor must ensure that a witness marker is placed at each peg or post in a rural area.

**18. Non-compliance with boundary marking**

(1) A surveyor or a person employed under the surveyor's supervision may, during a survey, only mark boundaries otherwise than in accordance with a clause in this Part if the Surveyor-General approves the marking before the survey begins.

(2) A surveyor may apply to the Surveyor-General for approval to mark boundaries otherwise than in accordance with a clause in this Part, by lodging with the Surveyor-General an application that –

- (a) describes the manner in which it is proposed to mark the boundaries; and
- (b) states why the manner in which it is proposed to mark the boundaries ought to be approved for use instead of the markings specified in a clause in this Part.

***Division 2 – Marking in urban areas***

**19. Marking angles and bends**

A surveyor must ensure that, in an urban area, each angle, bend or corner of a section, portion or lot is –

- (a) if the area of the section, portion or lot is not more than 1 hectare – marked by a peg;
- (b) if the area of the section, portion or lot is not more than 10 ha – marked by a peg or a steel peg;
- (c) if the area of the section, portion or lot is more than 10 ha – marked by a post, or by a steel peg and a witness mark.

**20. Intermediate marks**

A surveyor must ensure that intermediate pegs or steel pegs are placed on all boundary lines so as to ensure that the distance between marks is not more than 100 m.

**21. Reference marking**

(1) A surveyor must ensure that one or more reference marks are placed at sufficient points on street boundaries to ensure that groups of reference marks are not more than 200 m apart.

(2) If an urban lot is more than 1 hectare in area, a surveyor must ensure that sufficient reference marks are placed on each boundary of the lot (other than the road boundaries) to ensure that the reference marks are not more than 200 m apart.

(3) A surveyor must ensure that generally a reference mark is placed not more than 20 m from the mark to which it is referenced.

(4) A surveyor must ensure that where traverse points are to be shown on a plan of survey, they consist of an approved mark.

(5) A surveyor must ensure that there is placed, at all street intersections and preferably at a location suitable for GNSS observations, a concrete block, or drill hole, that has been recovered by at least 2 well-configured reference marks.

### ***Division 3 – Marking in rural areas***

#### **22. Marking angles and bends**

A surveyor must ensure that, in rural areas, each angle, bend or corner of a section, portion or lot is –

- (a) if the area of the section, portion or lot is not more than 10 ha – marked by a peg or a steel peg; or
- (b) if the area of the section, portion or lot is more than 10 ha – marked by a post, or by a steel peg and a witness mark.

#### **23. Intermediate marks**

(1) A surveyor must ensure that intermediate pegs or steel pegs are placed –

- (a) on all boundary lines at intervals of approximately 400 m; and
- (b) so that the distance between any 2 marks is not more than 500 m.

(2) A surveyor must ensure that if the length of a single boundary line is more than 3 km, marks consisting of a post, or of a steel peg and a witness mark, are placed at or near intervals of 2 km.

#### **24. Parallels of latitude**

A surveyor must ensure that a boundary described as a parallel of latitude is marked in a series of chords not more than 10 km long.

**25. Reference marking in rural areas**

A surveyor must ensure that in rural areas –

- (a) 2 reference marks are placed at all bends in roads and at sufficient other points on road boundaries to ensure that reference marks are not more than 500 m apart;
- (b) on boundaries (other than road boundaries) of lots containing an area of 10 ha or less – 2 reference marks are placed at sufficient corners and bends to ensure that reference marks are not more than 500 m apart;
- (c) on boundaries (other than road boundaries) of lots containing an area of more than 10 ha and for every isolated lot irrespective of area – 2 reference marks are placed at every bend or corner;
- (d) on long line surveys in isolated areas – 2 reference marks are placed at or near 2 km intervals and at each bend or corner and each intersection with another boundary; and
- (e) at all road intersections and preferably at a location suitable for GNSS observations – a concrete block, recovered by at least 2 well-configured reference marks, is placed.

**26. Boundary indicators**

If a boundary mark is not visible from the next adjoining boundary mark on a boundary line, a surveyor must ensure that a witness mark is placed on the boundary line at a distance of not less than 20 m from each bend, corner or intermediate mark.

**PART 6 – ACCURACY OF SURVEYS**

**27. Limiting error of closure**

(1) A surveyor must ensure that the limiting error of closure is determined in accordance with this clause.

(2) The limiting error of closure is the square root of the sum of the squares of the errors in latitude and departure, which are, together, to be not more than the total perimeter divided by  $x$ , plus 0.01 m, where –

- (a) in surveys of rural land where –
  - (i) the slope of the land is not more than 4 degrees from the horizontal – " $x$ " = 5 000; and

- (ii) the slope of the land is more than 4 degrees from the horizontal – "x" = 3 500; and
- (b) in surveys of urban land where –
  - (i) the slope of the land is not more than 4 degrees from the horizontal – "x" = 10 000; and
  - (ii) the slope of the land is more than 4 degrees from the horizontal – "x" = 5 000.

**28. Angular closure**

- (1) A surveyor must, if the nature of the survey permits, ensure that all angles necessary for an angular closure to be obtained are read.
- (2) The normal limits of angular closure are not to exceed 30 seconds +  $20\sqrt{n}$  –
  - (a) where "n" is the number of stations, including intermediate set-ups on straight lines; and
  - (b) provided that the maximum closure is 2 minutes in urban surveys and 3 minutes in rural surveys.
- (3) If the variation between a surveyor's observation and previously surveyed angles is more than 50 seconds, the surveyor must note the fact in the surveyor's report.

**PART 7 – FIELD NOTES, PLANS AND REPORTS**

**29. Rounding off**

A surveyor must ensure that distances are rounded off to the nearest 10 mm in rural surveys and to the nearest 5 mm in urban surveys.

**30. Offsets to occupation**

A surveyor must record and describe, and show on a plan of survey, each offset to any substantial improvement, suitable for use as a reference mark, that is within 1 m of a boundary.

**31. Field notes to be neat and complete**

- (1) A surveyor's field notes of a survey must –
  - (a) be neat, precise, complete and readily intelligible;
  - (b) record all measurements, observations and adoptions; and



(2) If it is necessary to adjust the latitudes and departures for the computation of an area, a surveyor must ensure that Bowditch's Rule is used.

**35. Recording of areas**

A surveyor must ensure the area of a surveyed parcel is recorded –

- (a) if the area is less than 1 ha – in a complete number of square metres of which each figure, if any, after the first 3 figures is replaced by a nought; and
- (b) if the area is 1 ha or more – in a number and decimal, if any, of a number, of hectares of which –
  - (i) each figure, if any, after the first 4 figures is replaced by a nought, and
  - (ii) each decimal part, if any, less than one hundredth is omitted.

**36. Original plans**

If a plan of a survey is required under an Act –

- (a) the surveyor is to draw it in accordance with these Directions and the Plan Drawing Standards, if any, approved by the Board; and
- (b) the surveyor must provide the following certificate on the plan drawn from his or her survey:

"SURVEYOR'S CERTIFICATE

I, ....., certify that the survey represented on this plan was carried out by me or under my supervision and was completed on ..... and that this survey has been executed in accordance with the *Licensed Surveyors Act* and the Directions thereunder.

.....  
Licensed Surveyor  
.....  
Date".

**37. Compiled plans**

- (1) A surveyor may only prepare a plan describing boundaries from the following:
  - (a) survey plans that have been lodged with the Surveyor-General and been examined;
  - (b) other survey data that satisfy the requirements of the Surveyor-General.

(2) A surveyor must provide the following certificate on a plan compiled from previous surveys:

**"SURVEYOR'S CERTIFICATE**

I, ....., certify that the survey represented on this plan was compiled from survey data and/or survey plan .....

.....

Licensed Surveyor

Date".

**38. Damaged plans**

A plan of survey that has been folded, creased, marked or otherwise damaged will not be accepted for the purposes of the Act by the Surveyor-General.

**39. Survey reports**

(1) A surveyor must lodge, with the field notes and plan of survey, reports containing –

- (a) an explanation of the datum adopted;
- (b) details of discrepancies and how they were resolved;
- (c) if an adjustment is made to true bearings – a statement as to the correction applied and the basis of the correction; and
- (d) easement requirements that were investigated.

(2) A surveyor must lodge paper copies of all closure and area calculations together with the survey report.

**40. Non-compliance with directions**

A plan of survey submitted under section 49 of the Act is not correct for the purposes of that section unless –

- (a) it is prepared, and the survey as a result of which it was prepared was carried out, in accordance with these Directions;
- (b) the Surveyor-General is satisfied that there are good and sufficient reasons for accepting it as correct although the survey as a result of which it was prepared was not carried out in accordance with these Directions; or

*Survey Practice Directions 2003 – Surveys Outside Coordinated Survey Areas*

- (c) the surveyor has applied for and received, before the survey, permission from the Surveyor-General to perform the survey in a manner not in accordance with these Directions.

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