

Traverse (surveying)

Traverse is a method in the field of [surveying](#) to establish control networks. It is also used in geodetic work. Traverse networks involved placing the survey stations along a line or path of travel, and then using the previously surveyed points as a base for observing the next point. Traverse networks have many advantages of other systems, including:

- Less reconnaissance and organization needed
- While in other systems, which may require the survey to be performed along a rigid [polygon](#) shape, the traverse can change to any shape and thus can accommodate a great deal of different terrains
- Only a few observations need to be taken at each station, whereas in other survey networks a great deal of angular and linear observations need to be made and considered
- Traverse networks are free of the strength of figure considerations that happen in triangular systems
- Scale error does not add up as the traverse as performed. Azimuth swing errors can also be reduced by increasing the distance between stations

The traverse is more accurate than [triangulation](#) and [trilateration](#), and sometimes even triangulation (Chrzanowski and Konecny, 1965; Adler and Schmutter, 1971)

There are many different types of traverse:

- Link traverse
- Polygonal/Loop traverse
- Open/Free traverse
- Close traverse

Utilisation :

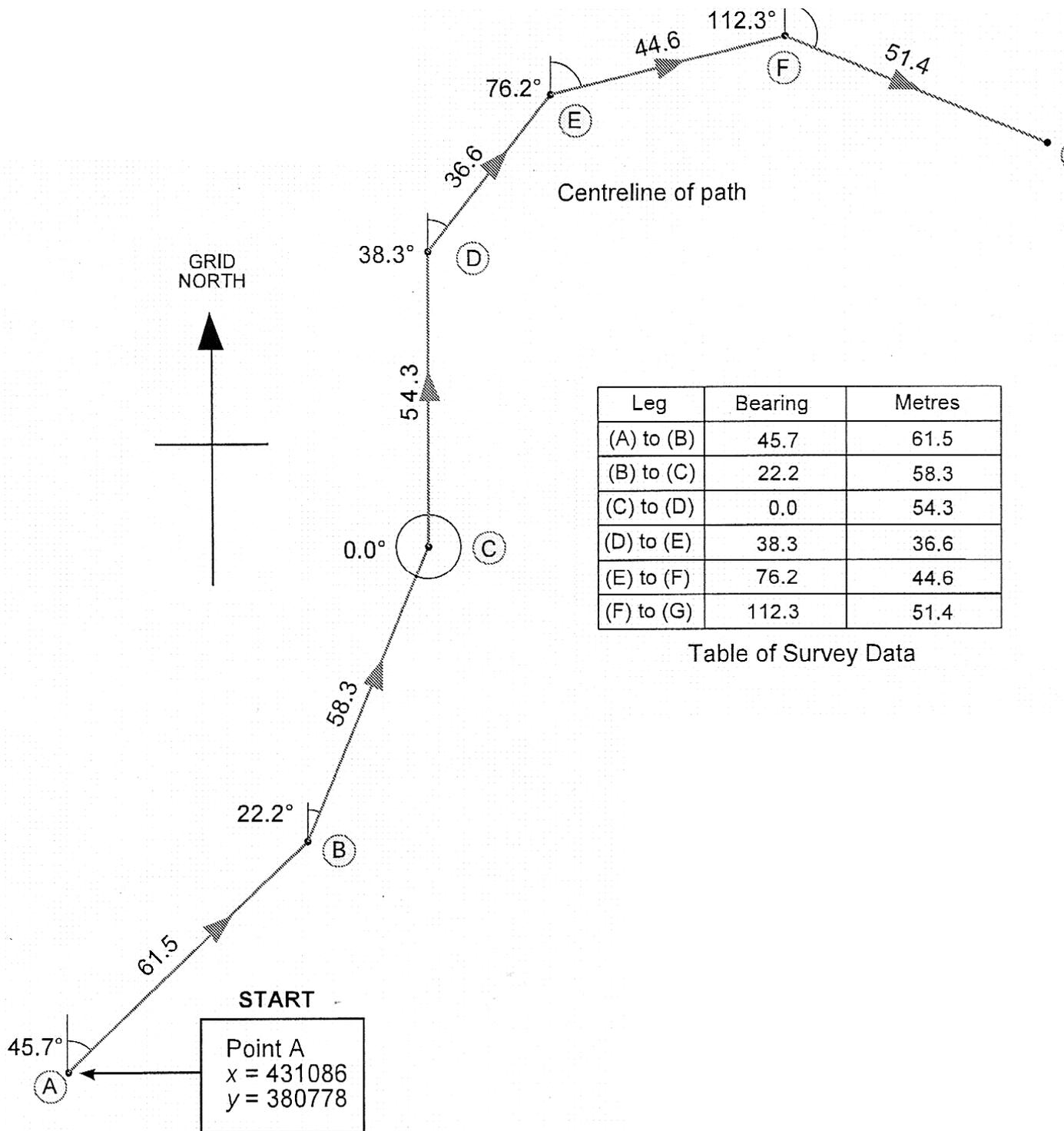
- Close traverse is useful in marking the boundaries of wood or lakes .
- Open survey is utilised in plotting a strip of land which can then be used to plan a route in road construction.

A16.2 Surveying by open-compass traverse (polyline)

Following sample descriptions (Annex 16.2 - 16.5) on surveys are derived from an [external document](#) to support surveying procedures with import to Map Maker. Thanks to

and with permission of Nick Hopton (UK).

The product of an open compass traverse is always a polyline. The corners of the line may represent points whose positions it is wished to plot, or the polyline may describe the shape of a linear feature. In the example provided the polyline is taken to represent the centerline of a path.



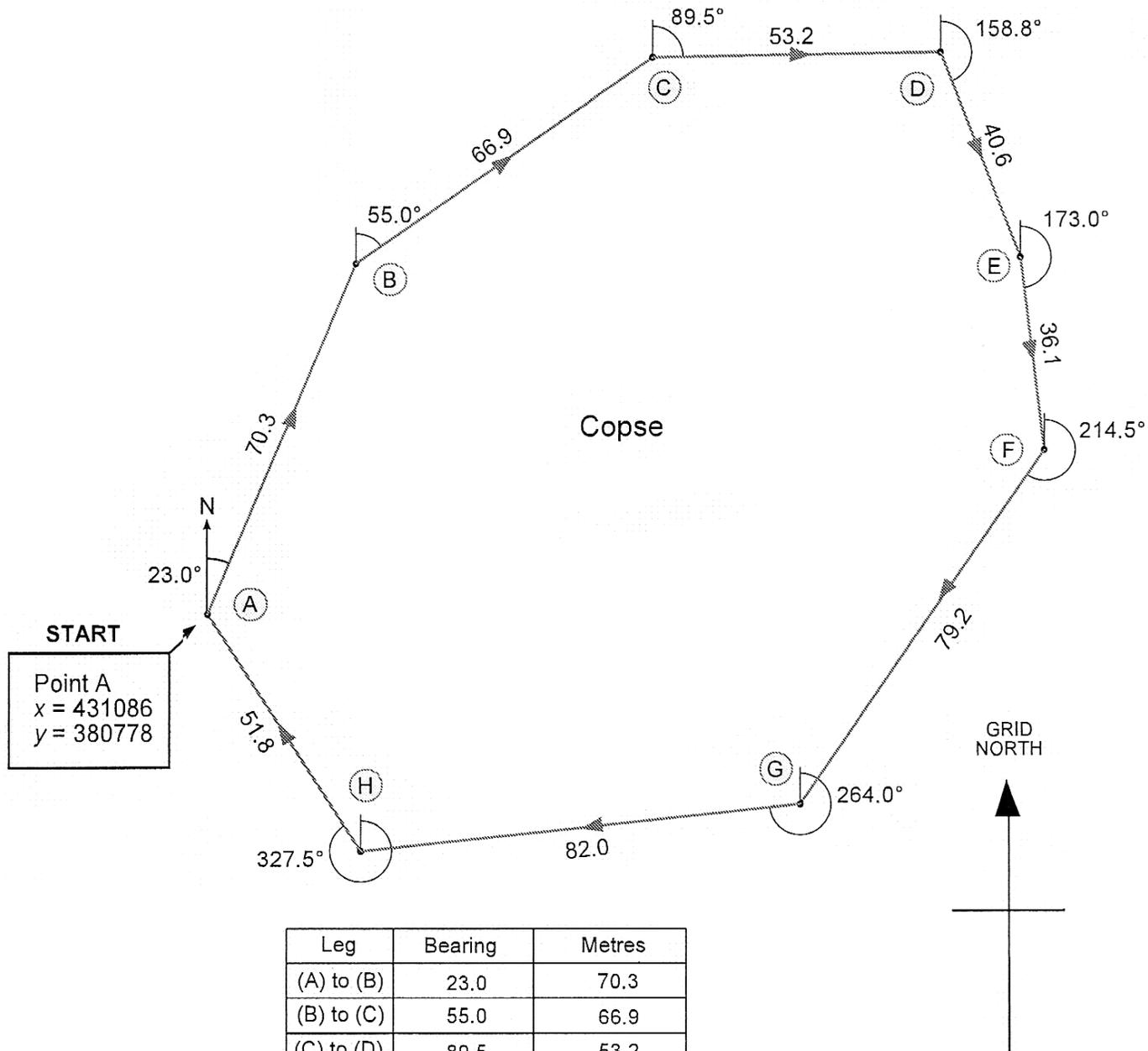
Set a marker on the ground at Point A. From Point A take a compass bearing on Point B, then measure the distance between Point A and Point B. From Point B take a compass bearing on Point C, then measure the distance between Point B and Point C. Repeat for the remaining legs of the traverse.

Record the results of the survey in a data table similar to that shown above. The bearings shown in the table of survey data are grid bearings. (Magnetic compass bearings must be converted to grid bearings by compensation for local magnetic variation. If magnetic north is west of grid north in the area of survey the variation is deducted from the magnetic bearing. If the magnetic north is east of grid north the variation is added to the magnetic bearing).

A16.3 Surveying by close-compass traverse (polyline)

The procedure is very similar to the open-compass traverse (see [Annex 16.2](#)), but enforces the creation of a polygon. The CLOSE statement in the xy file forces Map Maker to close the polygon. It is good practice to check the geometry of polygons by first plotting them without using the CLOSE statement. This will allow the magnitude of any surveying errors to be assessed.

The product of a closed compass traverse is always a polygone. The corners of the polygon may represent points whose positions it is wished to plot, or the polygon may enclose a landscape feature (as it does in the example below). The magnitude of surveying errors may be assessed by plotting the polygon in Map Maker without using the CLOSE statement in the XY file (see below).



Leg	Bearing	Metres
(A) to (B)	23.0	70.3
(B) to (C)	55.0	66.9
(C) to (D)	89.5	53.2
(D) to (E)	158.8	40.6
(E) to (F)	173.0	36.1
(F) to (G)	214.5	79.2
(G) to (H)	264.0	82.0
(H) to (A)	327.5	51.8

Table of Survey Data

Set a marker on the ground at Point A. From Point A take a compass bearing on Point B, then measure the distance between Point A and Point B. From Point B take a compass

bearing on Point C, then measure the distance between Point B and Point C. Repeat for the remaining legs of the polygon, ending at the starting point.

Record the results of the survey in a data table similar to that shown above. The bearings shown in the table of survey data are grid bearings. (Magnetic compass bearings must be converted to grid bearings by compensation for local magnetic variation. If magnetic north is west of grid north in the area of survey the variation is deducted from the magnetic bearing. If the magnetic north is east of grid north the variation is added to the magnetic bearing).

A16.4 Surveying by offsets (polyline or polygon):

The product of a survey carried out by offsets is a polyline whose corner, A to M in the example, might represent points whose positions it is wished to plot or points on a linear feature. In this example the feature under survey, represented by a broken black line, might be thought of as the edge of a stream.

Markers are placed at Station 1 and Station 2, and their positions are determined. The line connecting Station 1 and Station 2 is the baseline for the survey.

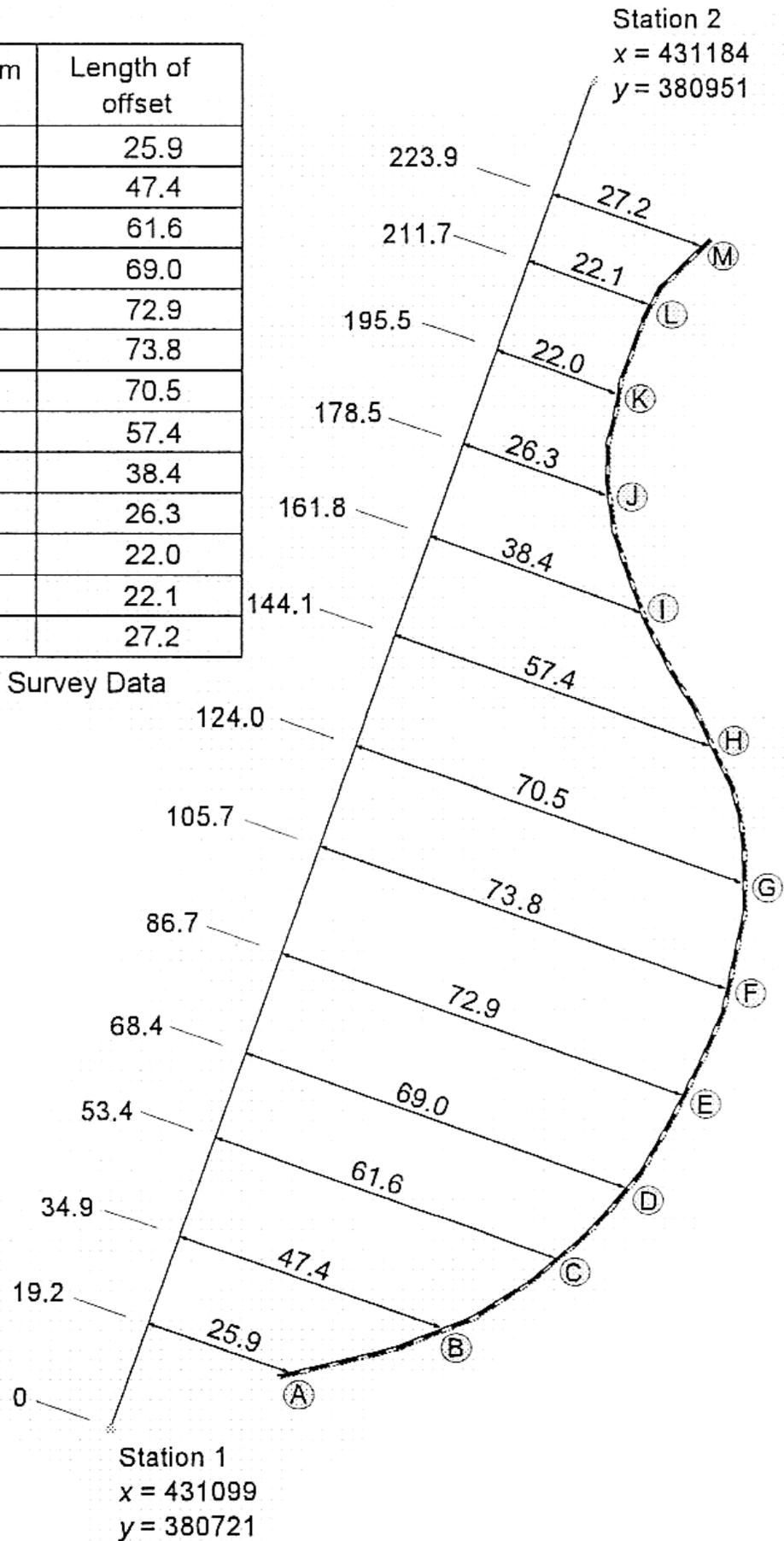
Offsets are measured at intervals from the baseline to the feature under survey. The offsets must be at right-angles to the baseline. In the example, the first offset starts at a distance of 19.20 m from Station 1 and is 25.90 m long. The second offset starts at a distance of 34.90 m from Station 1 and 47.40 m long, and so on for the remaining offsets.

Record the results of the survey in a data table similar to that shown below.

In the example shown, when viewed from Station 1 looking towards Station 2 the baseline has been set out to the left of the feature being surveyed. When a baseline is set out to the right of a feature (when viewed from Station 1 looking towards Station 2) the lengths of the offsets must be entered into the xy file as negative numbers.

Distance from Station 1	Length of offset
19.2	25.9
34.9	47.4
53.4	61.6
68.4	69.0
86.7	72.9
105.7	73.8
124.0	70.5
144.1	57.4
161.8	38.4
178.5	26.3
195.5	22.0
211.7	22.1
223.9	27.2

Table of Survey Data

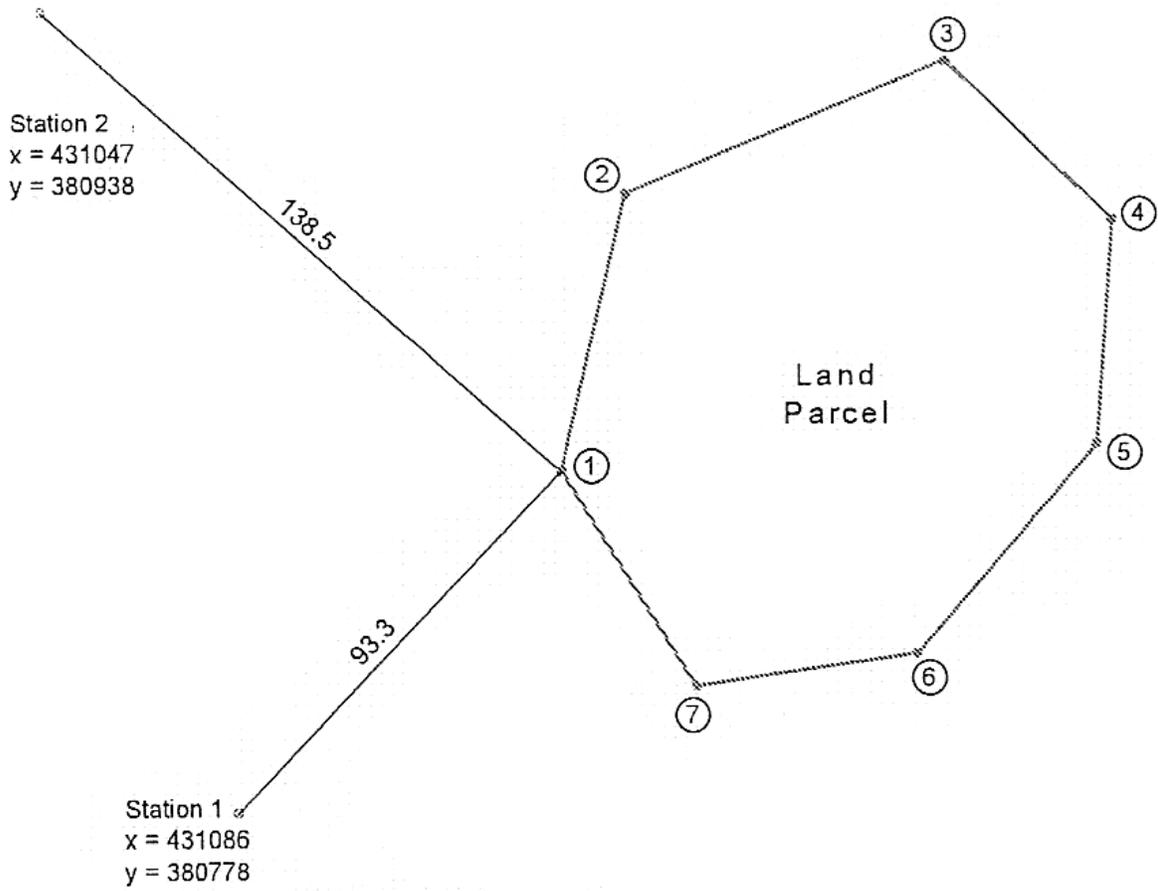


A16.5 Surveying by distances from fixed points (polyline or polygon):

The product of a survey carried out by measuring distances from two fixed points can be a polyline or a polygon. Map Maker will draw a polygon if the last coordinate in the xy file is the same as first one, as it is in the example. If the first and the last coordinates in the xy file are not identical a polyline will be drawn.

In the example the feature under survey is to the right of a line connecting Station 1 to Station 2, when viewed from Station 1. In cases where the feature under survey lies to the left of a line connecting Station 1 and Station 2, when viewed from Station 1, the distances measured must be entered into the xy file as negative numbers.

Set out two markers on the ground, Station 1 and Station 2, at points of known position. Then measure the distance from each station to Point 1, Repeat for the remaining points and record the survey data in a table similar to the one shown.



Point Number	Distance from	
	Station 1	Station 2
1	93.3	138.5
2	144.7	122.5
3	204.6	180.6
4	209.7	217.7
5	186.1	228.0
6	139.4	216.8
7	94.8	187.3

Table of Survey Data