

29.002 - Surveying II

FIELD EXERCISE: LEVELLING III (AREA LEVELLING)

1. AIMS

To familiarize students with the technique of area levelling using levelling instruments fitted with horizontal circles (direct contouring, radiation, stadia).

2. EQUIPMENT

Per Group:

- 1 Tilting Level WILD NK2 with tripod
- 1 Wooden, folding levelling staff with staff bubble
- 1 Ranging rod
- 1 Survey umbrella with steel base
- 1 Crayon
- 1 Hammer
- 1 Fibreglass or linen tape
- 1 Clipboard

Demonstrator:

- 8 Ranging Rods

3. EXERCISE

3.1 Carry out the two-peg test to check the permanent adjustment of your level. Use two crayon marks (40 m apart) on a kerb for that purpose. If the two height differences obtained from both instrument set-ups differ by more than 3 mm, the test must be repeated by another group member. If your first result is confirmed, call your demonstrator for the adjustment. Book test on field form.

3.2 In an area of approximately 40 m by 40 m on the lawn between the Main Building and Barker Street (as indicated by your demonstrator), set-up your levelling instrument in such a location, that G104 and SSM 4775 or SSM 4779 are visible and that the area defined can be surveyed easily. Prepare a sketch of the area in your field book. (In addition to the above 3 marks, 244 and 245 may also be used).

3.3 Set-up staff on the most distant survey mark, and read circle. Measure all three hairs and book on field form. Set-up staff on second survey mark and record and note all three hairs as well as the horizontal circle reading. From information given in the appendix compute the height of collimation of your levelling instrument.

3.4 Considering the required contour interval of 0.5 m, compute the staff readings fitting the appropriate contour lines in the area.

3.5 Survey the contour lines by taking spot heights along the contour line. The staff man must be guided onto the contour line so that the actual staff reading does not differ by more than 5 cm from the expected one. The spacing of these points is not to exceed 5 m. All three hairs and the circle reading are booked for every point. The levelling staff must be supported laterally by the ranging rod. All points surveyed must be numbered. This number has to appear on the booking form and field sketch.

3.6 After completion of the contour survey, important details should be surveyed using the same technique (3 hairs, horizontal circle). Details to be surveyed are: Roads, footpaths, fences, trees, bushes, etc.

3.7 The zero of the circle must be checked periodically throughout the exercise, and the results booked.

3.8 If it is not possible to survey the whole area from one instrument station, steps 3.2 to 3.7 may be repeated for another station.

#### 4. REPORT/PLAN

Each student is to submit a plan 1:250, depicting the contour lines (0.5 m interval) and all other details surveyed. This plan should be correctly and neatly drawn and presented as per standardized approach, summarized in the "General Course Information".

The coordinates of the permanent survey marks are listed in the appendix and should be used to compute the coordinates of the instrument station in an appropriate way. These computations are part of the report. The N.S.W. I.S.G. grid should appear on the plan.

Both, the original plot on cartridge paper as well as the final plan (on tracing paper) are to be submitted.

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#### APPENDIX

Coordinates and elevations of survey marks. Coordinates refer to the 'Campus Network 1980' and the 'N.S.W. Integrated Survey Grid, Zone 56/1'. Elevations are given in the Australian Height Datum (A.H.D.).

MARK	E (m)	N (m)	ELEVATION (m)
G104	321 146.41	1245 274.71	29.59
SSM 4775	321 080.64	1245 277.44	27.96
SSM 4779	321 221.70	1245 273.44	32.22
244(PL1)	321 229.70	1245 340.17	31.90
245(PL2)	321 168.63	1245 339.29	30.37