## Geological Mapping Exercise 3 - Answers

The width of an outcrop is determined by:

- the true thickness of the stratum (formation),
- the angle and direction of dip of the stratum, and
- the slope of the land surface where the outcrop occurs.

1. Refer to the diagrams and answer questions a – d.

Note: Each diagram uses a scale of 1cm = 2m, T is thickness of stratum, LS is land surface and Cn is width of outcrop.

For each diagram measure the width of the two outcrops (in metres) and give a reason for the difference. Write your answers in the spaces provided below.
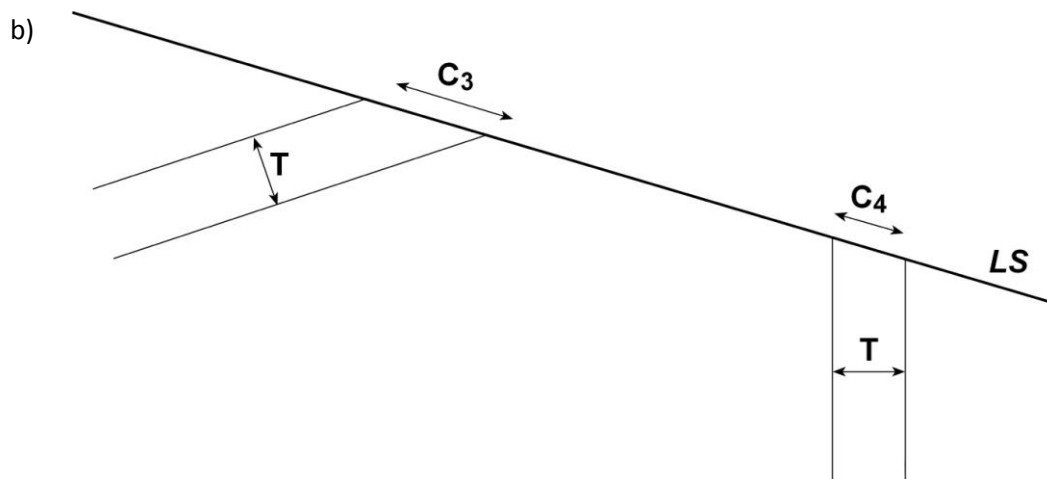
a)
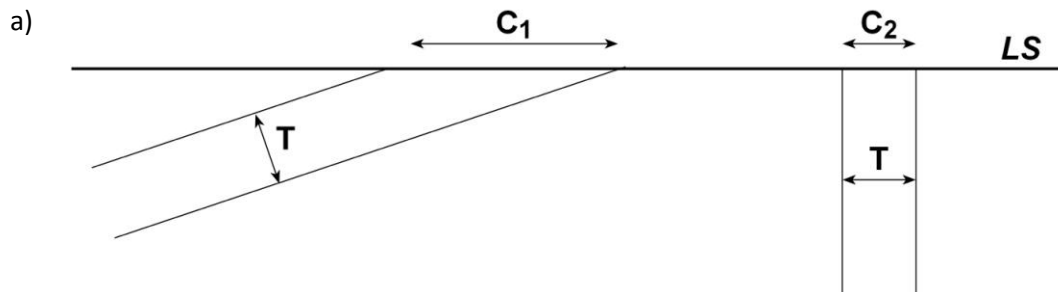


T = 2m          C1 = 6m          C2 =2m

Reason for difference
The smaller the angle of dip, the larger the width of outcrop.
C2 is the same as T since angle of dip is vertical
C1 is greater than T and C2 since angle of dip is inclined to LS

b)



T = 2m          C3 = 3m          C4 =2.1m

Reason for difference
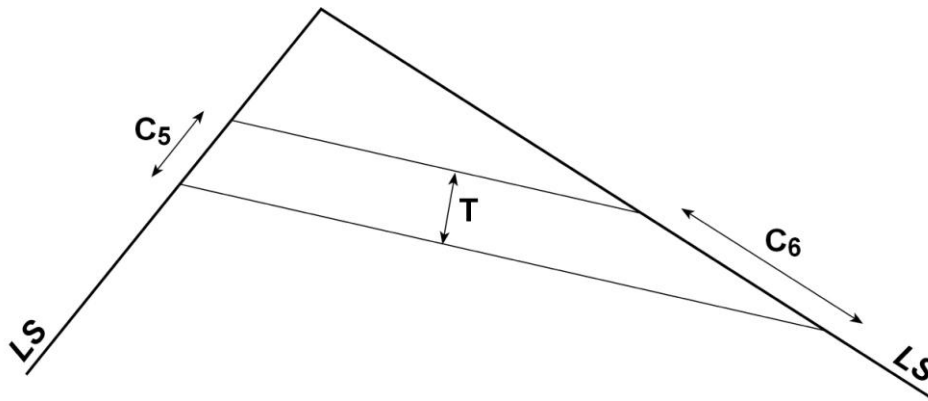Inclination of slope as well as angle of dip determine the width of outcrop
C3 - angle of slope gives a smaller width of outcrop than if LS were horizontal.
C4 > T and < C3 due to vertical dip + angle of slope

c)



T = 2m                C5 = 2.1m              C6 = 5.6m
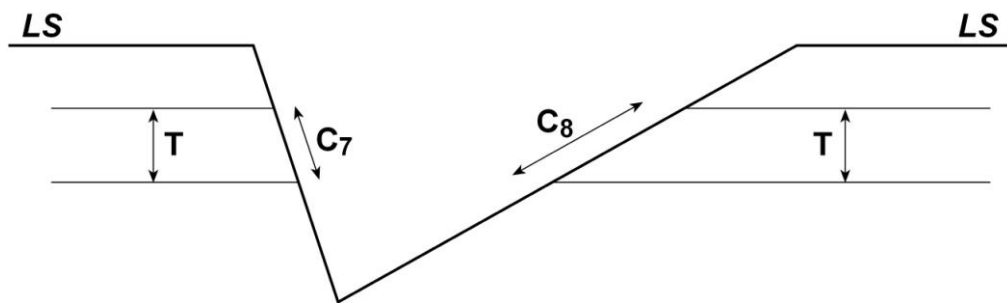
Reason for difference
Greater the angle of slope, smaller the width of outcrop
C6 – large due to dip and slope in same direction.

d)



T = 2m                C7 = 2.1m              C8 = 4m

Reason for difference
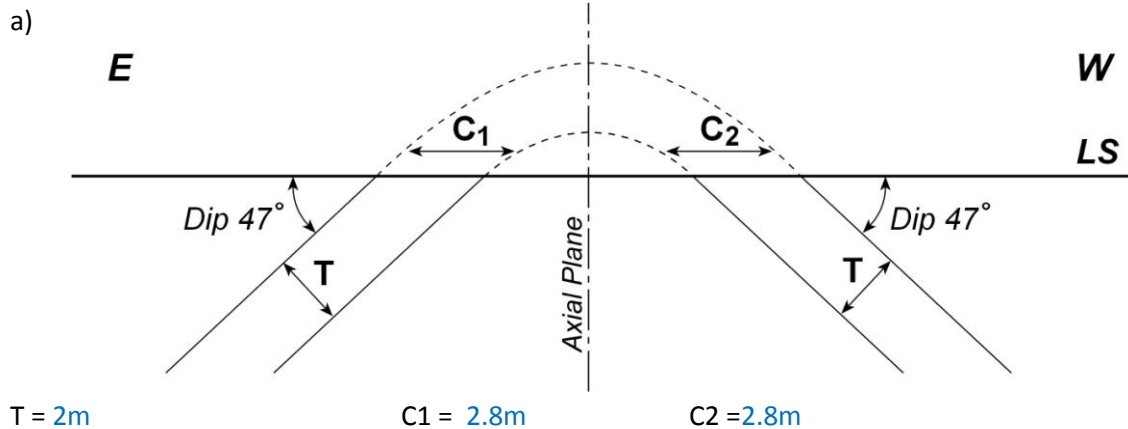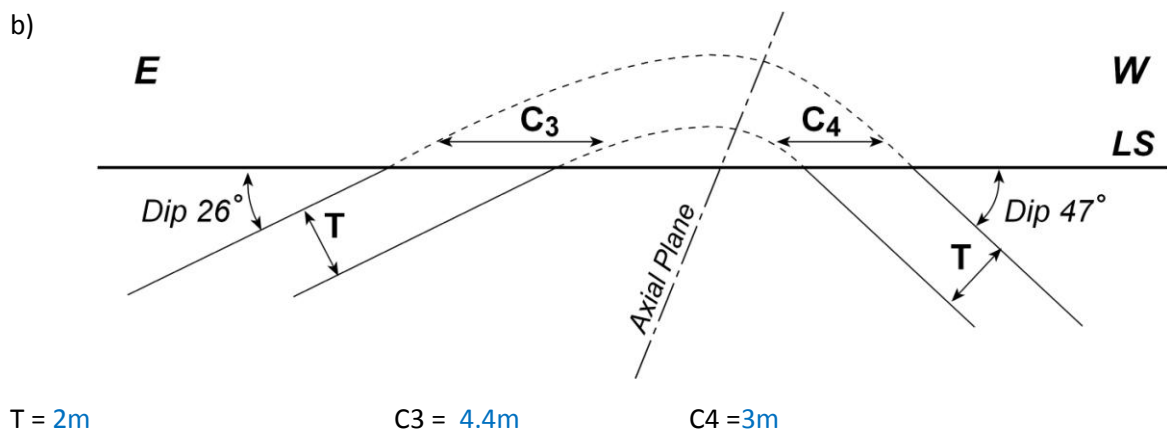Greater the angle of slope, smaller the width of outcrop

**Problem Set 2**

Note: Each diagram uses a scale of 1cm = 2m, T is thickness of stratum, LS is land surface and Cn is width of outcrop.

1  For each diagram measure the width of the two outcrops (in metres) and give a reason for the difference or similarity.

a)

E                                                                          W

$C_1$        $C_2$        LS

Dip 47°        Axial Plane        Dip 47°

T        T

T = 2m                         C1 =  2.8m                C2 =2.8m

Reason for difference
Symmetrical anticline and horizontal LS, thus widths of outcrop are the same.

b)

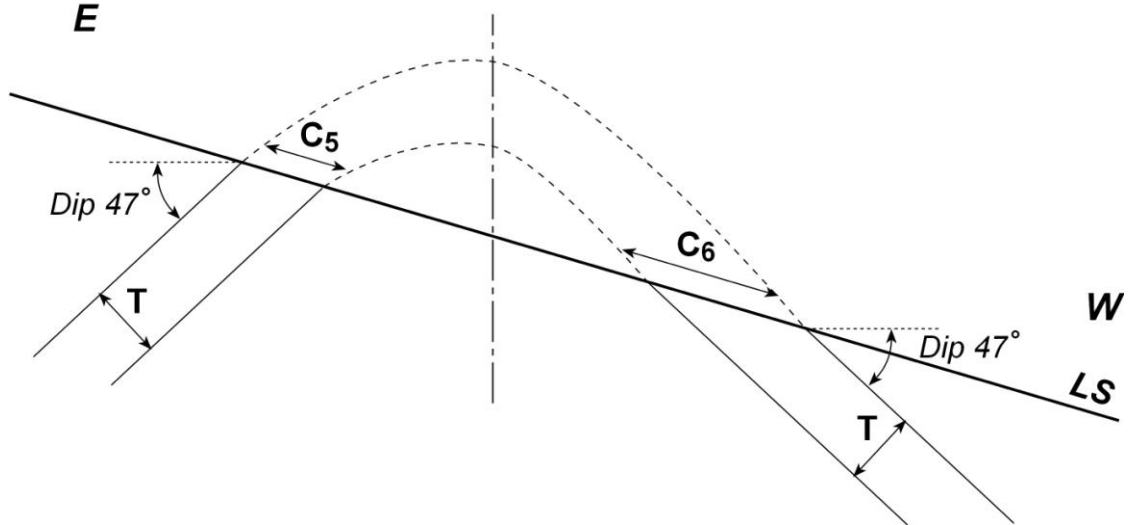E                                                                          W

$C_3$        $C_4$        LS

Dip 26°        Axial Plane        Dip 47°

T        T

T = 2m                    C3 =  4.4m            C4 =3m

Reason for difference
Asymmetrical anticline.
The greater the angle of dip, the smaller the width of outcrop.

c)



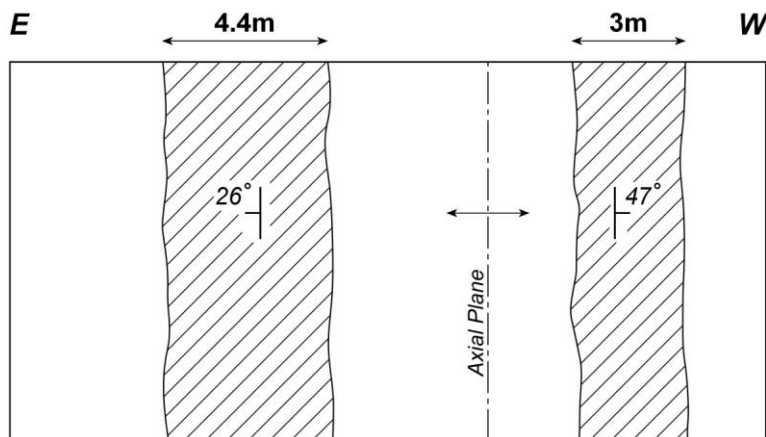T = 2m                    C5 = 2.4m                    C6 = 4m

Reason for difference
The greater the angle of dip, the smaller the width of outcrop.
C5 determined by dip + angle of slope (47 +15 = 52 degrees).
C6 determined by dip – angle of slope (47 – 15 = 26 degrees).

2. For 1b) draw in the space provided below a **plan map** to show what the two outcrops would look like on a land surface.

3. A rock stratum with a thickness of 2 metres forms an asymmetrical syncline. The two limbs dip at 20 and 40 degrees respectively.
The stratum outcrops at two places on a level land surface. The distance between the centre of the two outcrops is 16 metres.

   a) Draw a cross section to show the syncline (Use a scale of 1cm = 2m)
   b) Measure the width of the two outcrops (in metres)