Step by Step Guide to Off-Set Surveying

Off-set surveying is a traditional method of mapping earthworks. It is less accurate than modern surveying techniques, but the process is relatively easy.

Before you start

1. Seek permission from the landowner (and tenant farmer, if applicable). Enquire about past land use of the site, e.g. How long has the site been pasture? Has it been ploughed in the past and to what depth? Has there been any quarrying?

2. Once you have fixed a date for the exercise, please notify Cambridgeshire Historic Environment Team (HET) that you are about to commence work and request an Event Cambridgeshire (ECB) number by completing the 'about to start a research project' section of the HER Report Form: http://surveys.thehumanjourney.net/index.php?sid=12258&;newtest=Y&lang=en

3. You will need two or three participants. Decide who is in charge of the project. Ensure that everyone is agreed about the general forms and extent of the features to be recorded, and define your research aims for the project.

Equipment

3 x 2m ranging poles
2 x 30m tape
5 x grid pegs
1 x drawing board/plane table board
1 x 5H or 6H pencil
1 x scale ruler
1 x hand tape
1 x optical square (if available)
4 x 50m tape
1 x magnetic compass
1 or 2 x sheet gridded permatrace
1 x masking tape
1 x eraser
1 x notebook and biro
1 x handheld GPS (if available)

When to do it

Best conditions are:
Fairly short grass, or crop off field
Winter (as low grass level and good visibility)
Weather not too cold!
Dry (permatrace discolours when wet)

Setting up the Equipment

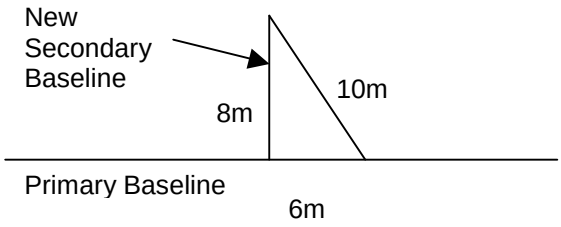
1. Secure the permatrace to the drawing board using the masking tape. Decide on a scale, depending on how large your area and how detailed the survey – you may find a scale ruler useful to easily provide the scale. 1:500 is a good scale for many purposes.

2. Set up a primary baseline across the middle of the site, so that all points to be surveyed can be reached conveniently, ideally on a North-South or East-West axis. Extend a 50m tape in a straight line, and place three 1m ranging poles at 0m, 25m and 50m intervals along it, ensuring that the three ranging poles are exactly in line with each other by sighting them in. Once you are sure you have a straight line, remove the two

ranging poles at each end of the tape and mark them with grid pegs. Leave the middle ranging pole and the tape in place.

3. Mark the position of the baseline and ranging poles on the permatrace: you will probably want to mark this somewhere in the middle of your sheet, depending on where you have set out your baseline. Use a compass to find North, and mark this on the plan.

4. Set up a secondary baseline to intersect your primary baseline at right angles. To find a perfect right-angle, set up a 6m - 8m - 10m triangle (this is more accurate than a 3m – 4m – 5m triangle for longer lines) extending from the 25m point of the primary baseline.



Mark the point where the two tapes intersect at 8m and 10m with a grid peg (see picture, right).

5. Line up the two points of your secondary baseline (the ranging pole at 25m on the primary baseline and the 8m/10m grid peg) with a 50m tape. Extend the tape on both sides of these two points for e.g. 50m to form your secondary baseline (see picture, right). Place ranging poles at each end and sight them in as in Step 1, ensuring that your two fixed points are still in alignment to get your perfect right angle. You should now have a large 'cross' of tapes across your survey area.

6. Draw the position of the secondary baseline on your permatrace. This should be straightforward if you are using gridded permatrace, and from now on you will probably not need to use your scale ruler, since you will be able to count the number of squares.

7. If you are surveying a large area, you may find it useful to create more baselines, e.g. at 10m intervals across the site in a gridded fashion so that you are never surveying further than 5m from a baseline.

Conducting the Exercise

1. Write the site name, location, grid reference (from an Ordnance Survey map), date and names of surveyors on the permatrace. Draw a North arrow.

2. Measure your first point. Send a colleague with the end of a 30m 'mobile' tape to the first point you wish to survey, and extend

the other end to the nearest baseline (see picture, right). You may note that in the picture the person holding the far end of the tape isn't holding the tape at the point on the ground to be measured, but rather holding it level with the baseline tape. This ensures complete accuracy. Ensure your mobile tape is at an exact right angle to your baseline by swinging the mobile tape back and forth along the baseline. Once you are sure you have an exact right angle, read your first point (e.g. "the slope starts at 4.5m from 34m on the baseline") and plot it on your plan.

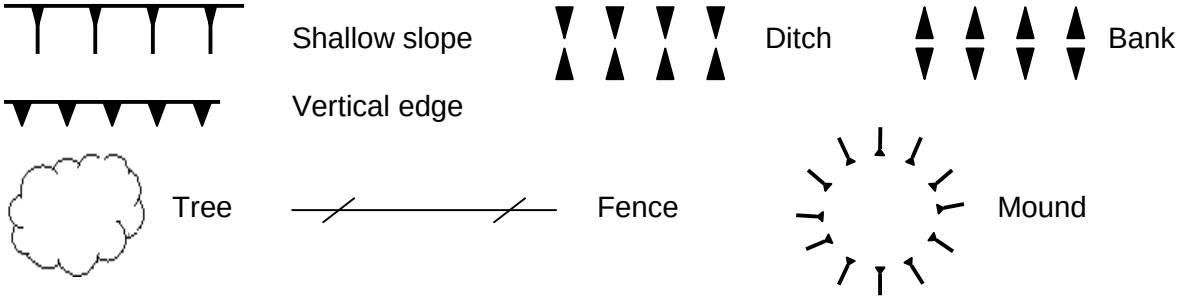
3. Continue in this vein, marking all the features on your plan using the drawing conventions shown below. When recording features such as slopes, you may wish to take readings at every 5m along your baseline. Take measurements at both the top and bottom of the slope, and use a hachure to draw a line between points, with the 'V' shape at the top of the slope.

4. Once you have the bare bones of your plan, check that all your recorded features appear accurately represented. Now you can return to intricate features and measure their exact dimensions in more accurately using a hand tape.

5. Once you have completed your survey (or have finished work for the day), GPS in both ends of the primary baseline using a handheld GPS and mark the co-ordinates on the plan. Use these co-ordinates and the compass arrow to plot the location of your plan on an Ordnance Survey map or Google Maps. In the absence of a GPS, measure the position of the plane table from two fixed points such as a road or corner of a building.

Drawing Conventions

Hachures are used to denote direction of slope, with the arrow pointing down the slope.



After the Exercise

Report brief findings to the Historic Environment Record (HER) using the online Jigsaw HER Report Form: http://surveys.thehumanjourney.net/index.php?sid=12258&newtest=Y&lang=en. Then write a site report structured by aims, methods, results, interpretation and additional information, and submit it to the HER within six months of the exercise.