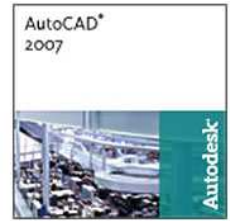


Using AutoCAD to Digitise Archaeological Plans



AutoCAD

Hopefully the version of AutoCAD installed will be AutoCAD 2007, however if it isn't don't worry this guide should apply to earlier versions, certainly post AutoCAD 2002.

In AutoCAD there are two ways of selecting a desired option. Tools and tasks can be chosen from the numerous menu bars and buttons or commands can be manually input via the AutoCAD commandline.

Because the menus may change between versions of AutoCAD I'll use the manual commands here.

Using the Digitiser



Calibrating the digitiser

Lift the clear plastic sheet on the tablet and place underneath the plan, map, or illustration you want to digitise making sure it is securely in place.

Identify the reference or control points you intend to use, and make a note of their co-ordinates. In general these control points will be the grid points used on site and at least two should be marked on the plan with their co-ordinates. If the plan you have received does not have two known referenced points then check with the director or supervisor to establish what to do next.

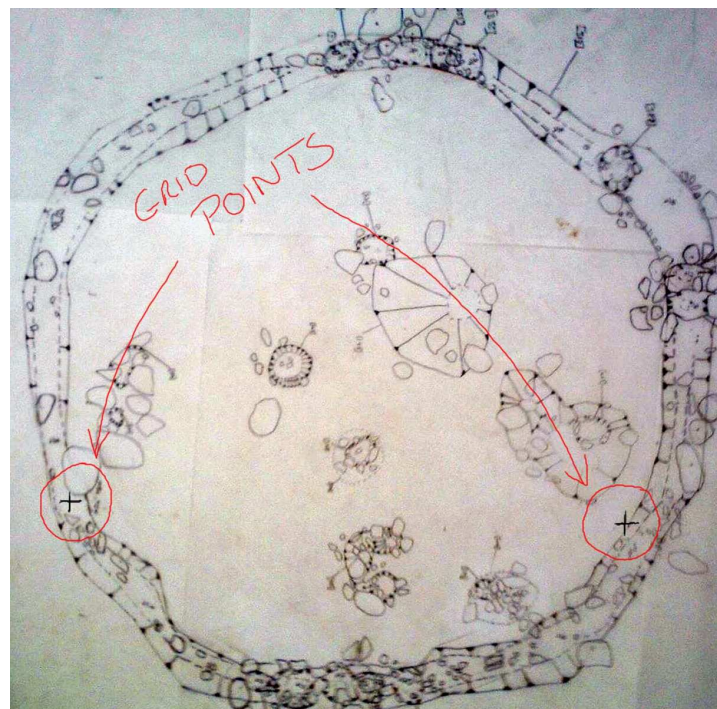
It's important that the plan remains secure because if, once calibrated, it becomes loose or is knocked out of place, further points taken will be inaccurate with regard to the initial reference points.

Now we can start AutoCAD.

Open either the master site plan file (an initial drawing with baulks, boundaries etc. marked) or a new file. If you are opening a master site file make sure it is using the same co-ordinates grid as those plans awaiting digitising (i.e. on the site grid, not the OS national grid).

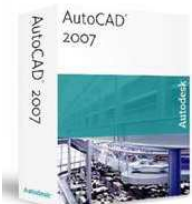
If you're opening a new file use the already created Template.dwg file which contains layers applicable to archaeological excavations.

Imagine the following plan were to arrive how would we deal with it?



105E, 95N

110E, 95N



I've circled the grid points in red. We'll use these as our control points to place the rest of the drawing into its correct co-ordinated position. Beside these grid points should be their co-ordinates written down.

Below I will show AutoCAD's prompts and reports like this: and our input like this.

```
Command: tablet
Option (ON/OFF/CAL/CFG): cal
Digitize point #1:
Enter coordinates for point #1: 105,95
Digitize point #2:
Enter coordinates for point #2: 110,95
Digitize point #3 (or press ENTER to end): ENTER
```



First type **tablet** (press return) and then **cal** (for calibrate). You will then be asked to **digitize point #1** (see above). It is at this prompt that you use your digitising pen to click on the first control point (e.g. the left hand point on the above plan). Then you will be asked to **enter coordinates for point #1**. It is here that you type in the co-ordinates as seen next to the control point you just selected (e.g. 105,95). Now repeat this for the other control point. Then press enter when asked for the 3rd control point to end the calibrating.

It is worth crudely checking your calibration by tracing something recognisable, or just hovering the pen over parts of the plan and seeing if their location on the CAD drawing is as expected.

Before we begin tracing lines or points from the plan I should mention the layering system AutoCAD and other programs, such as Adobe Illustrator and CorelDraw, use. This layering system has several benefits.

Firstly it allows us to clearly see which traced lines belong to which archaeological category, i.e. edge of excavation, feature, modern field drain etc. This is helped by the assignment of colours to layers, i.e. green for features, pink for bottom break of slope, white for stones etc.

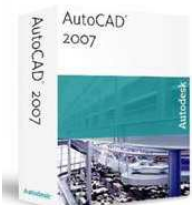
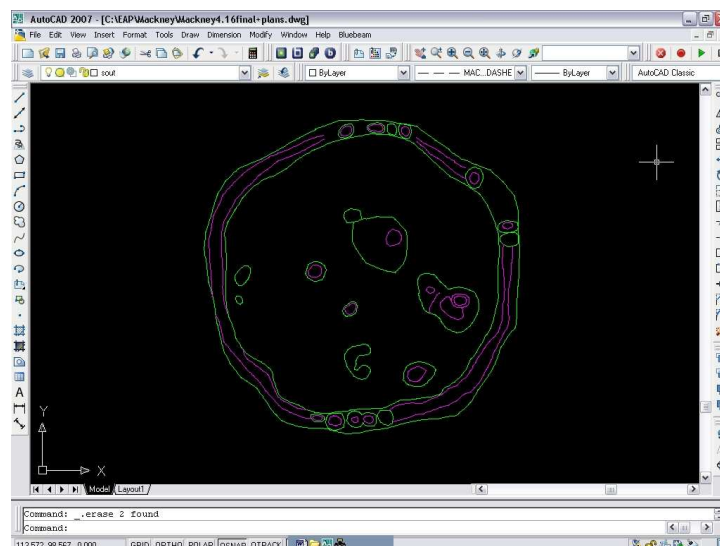
Layers can also be switched on and off enabling the user to easily isolate certain information from the drawing, i.e. grave cuts, stones etc. This means that layers can ultimately become beneficial when it comes to illustrating the phasing of sites, i.e. features belonging to certain periods can be lumped into a respective phasing layer.

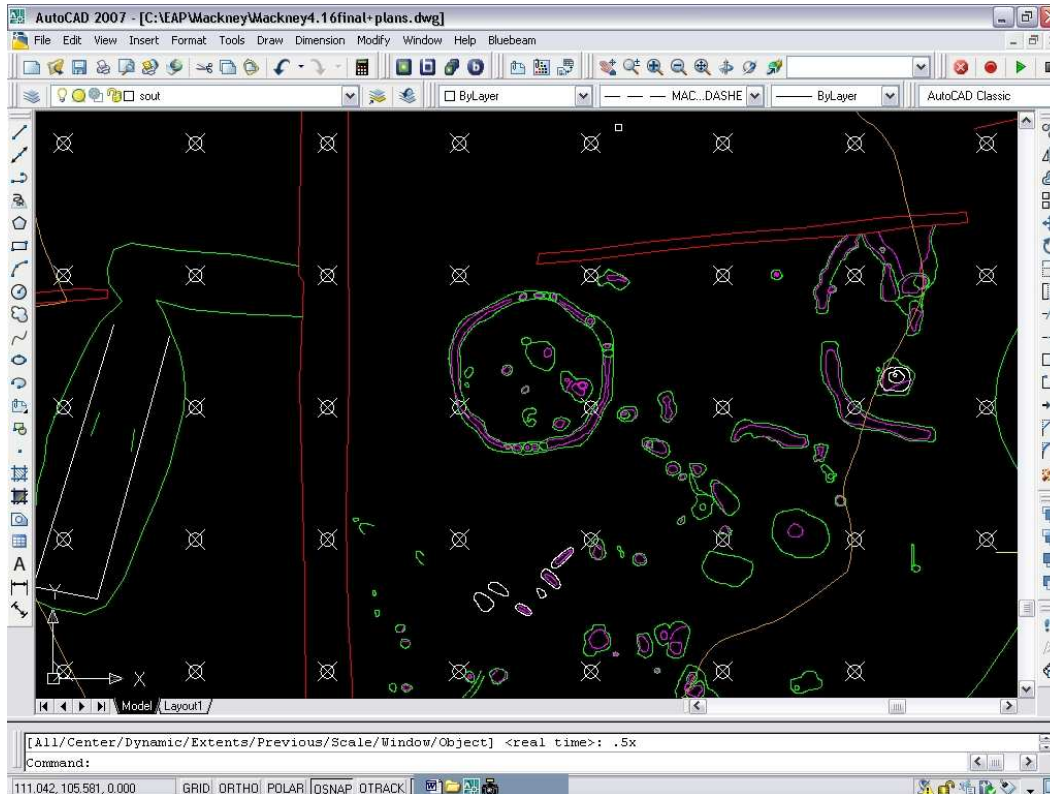
It makes sense to select the relevant AutoCAD layer before sketching, even though they can be changed after, as it saves time and often confusion. So if we intend to first trace around the cut of a pit, we should select the Feature layer (green) and then trace.

To start tracing we must use the sketch command;

```
Command: sketch
Record increment <1.000>: 0.08
Sketch. Pen eXit Quit Record Erase Connect .
```

Now the pen can be used. Once on the tablet it will trace from the put down point to wherever you move. Pressing **Spacebar** will act as enter and end the current trace line, placing the pen back down on the tablet will continue tracing in a new place. Pressing **ESC** will stop the trace and erase what was just done.





Above are two screenshots from AutoCAD showing our original plan in isolation, and another showing it in its wider context with other features and the site baulks.

Notice that the stones are not present in these CAD drawings. However these should be done at the digitising stage, onto a separate layer, which can then be turned off or altered in Illustrator at a later date. It is worth attempting to include all data from the permatrace plans at this stage. The exception to this will be hachures (described later). The CAD drawing can then act as a digital backup to the original hand drawn plans and information not needed can be turned off or deleted later (although an original should always be saved with nothing deleted from it).

When sketch is used to produce a line which will form a circle (e.g. posthole cut), the OSNAP tool should be used to join the two ends together so that an unbroken line is created.

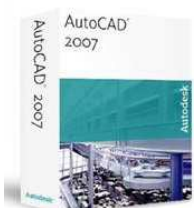
If we have straight lines on our plan (edge of excavation, baulks etc.) we can use the polyline command.

E.g. Imagine we have to digitise a plan/plans of a burnt mound/fulacht which has straight excavation edges forming a square with four corners.

To plot this excavation limit we would use the digitizing pen to mark the four corner points whilst drawing a line between them. For this we would use the Polyline option. (This is a very simple example, in reality we would have to take many points along the edge of ex as it is rarely straight from corner to corner!)

Enter the command pline which means 'start drawing a polyline':

Command: **pline**
From point:



Use the digitising pen to click on each of the four corners of the map:

```
Current line-width is 0.0000  
Arc/Close/Halfwidth/Length/Undo/Width/<Endpoint of line>:  
Arc/Close/Halfwidth/Length/Undo/Width/<Endpoint of line>:  
Arc/Close/Halfwidth/Length/Undo/Width/<Endpoint of line>:
```

Then the command to close the polyline and create a square, Use c:

```
Arc/Close/Halfwidth/Length/Undo/Width/<Endpoint of line>: c  
Command:
```



Here is a useful command to see the extents of what you have drawn, Use z:

```
Command: z  
ZOOM All/Center/Dynamic/Extents/Previous/Scale(X/XP)/Window/<Realtime>: e  
Command:
```

This is a basic introduction and there is plenty more to get to grips with but hopefully this will help, at least initially.

For our projects we have created a few guidelines to be followed;

- Text (cut numbers generally) as well as hachures will be added to the drawings when the CAD illustration has been exported to Adobe Illustrator. However it is worth adding the text, in CAD, as you go making sure it is on a separate layer which can be switched off before exporting. Otherwise cross referencing will have to take place, at the Adobe Illustrator phase, with each individual permatrace plan which will be a real pain.
- Hatching or shaded should not be used in CAD as this cannot be transferred to Illustrator.
- Only Polylines should be used (polyline, 3D polyline or splines of polylines) when drawing in CAD. Again exportation of plain lines will not work to Illustrator.
- A standardized North arrow and scale bar will be provided which should be added to the CAD drawing, again onto a separate layer.
- Individual descriptive layers will be transferred to Illustrator one by one, from the digitised CAD drawing.
- Once in Illustrator the colour of layers can be changed and a greyscale will be used.

You should read the AutoCAD Online Help as well as playing around in Cad for a bit to familiarize yourself with the controls and commands.