Farmplan gatekeeper

Field and farm mapping

Gatekeeper mapping module

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Contents

Introduction to mapping

Mapping is an optional module that can be added to your Gatekeeper software. It can be used in conjunction with the precision farming modules for the import and export of work maps. This guide will cover the use of the mapping module, which may be complemented by the precision module guide.

Once mapping is enabled, there are two different map windows. The farm map displays all fields, while the field map displays all work linked to a specific field. (If the precision farming modules are active, the job map is also accessible through work plans; more information is available in the accompanying precision modules handbook.)

The farm map is accessed from the main screen by clicking on the globe icon; the field map is accessed through the field record, on the field tab.

	Farm map	Field map
View multiple fields	✓	✗
View cartographic layers	✓	✓
Edit cartographic layers	✓	✗
View field job maps	✗	✓
View historic field jobs	✗	✓
View & edit field zone layers	✓	✓

Cartographic layers are 'drawing' layers, and have no connection to field records. They are ideal for pictorial display maps, such as NVZ and soil risk assessment maps or estate maps.

Field zone layers are linked to the field records, so they are ideal for recording areas or zones which may affect future field decisions. Field zone layers are split into two groups: cropping year specific layers which give you a fresh start with each new cropping year, and 'all years' layers which remain with the field throughout cropping years.

The field boundary provides the link between field records and the farm map. Where a field boundary changes between cropping years, an extra step called swapping the field region must be taken before changing the boundary. This ensures the change is not applied to previous years.

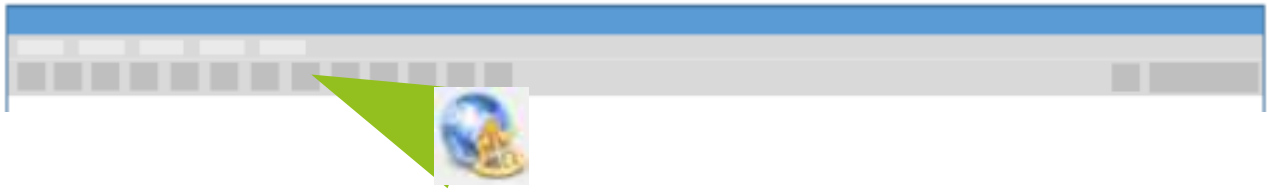
Image layers give the ability to import image files and underlay them into your mapping – for example, paper drainage maps.

This guide does not cover elements of mapping which are related solely to the precision farming modules. There is a separate guide covering the precision farming functionalities, available through your Gatekeeper help module and the Farmplan website.

This guide is for the full optional mapping module. For information on the Farm Mapping Lite module, please click here.

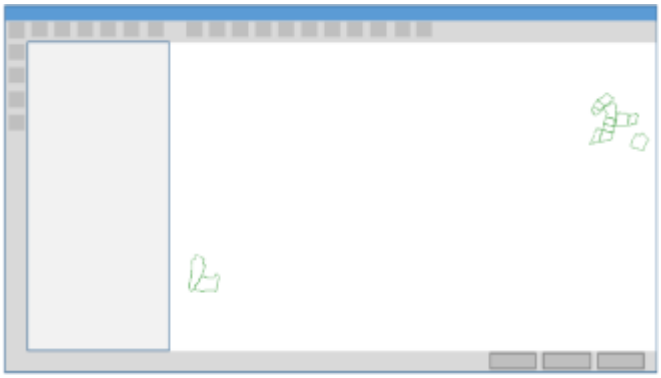
Field maps and farm maps

The farm map is opened from the main Gatekeeper screen by clicking on the globe icon:

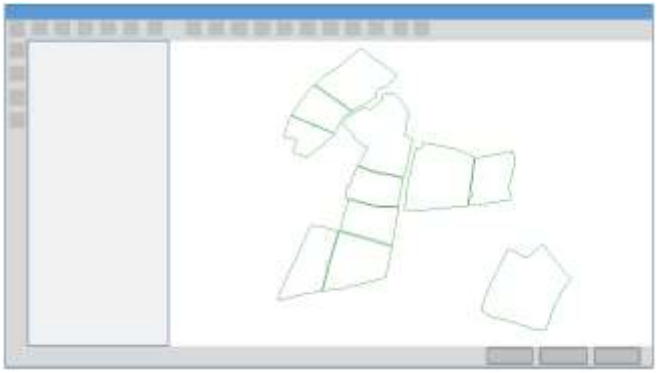


If no field boundaries are present, the message 'No field boundaries exist for the selected field groups so no map can be displayed' will be presented. You will need to add at least one field boundary by either manually adding a boundary (p.14) or by importing a boundary (p.17) before the farm map can display any data.

The farm map view is automatically centred on the selected field group(s). For this reason, it is often useful to ensure that your field groups match the geography of your fields, so that the automatic zoom level takes you to a practical view. For example, if a field group contains two fields much further away from the other fields, it may be useful to put those two fields in a different field group:

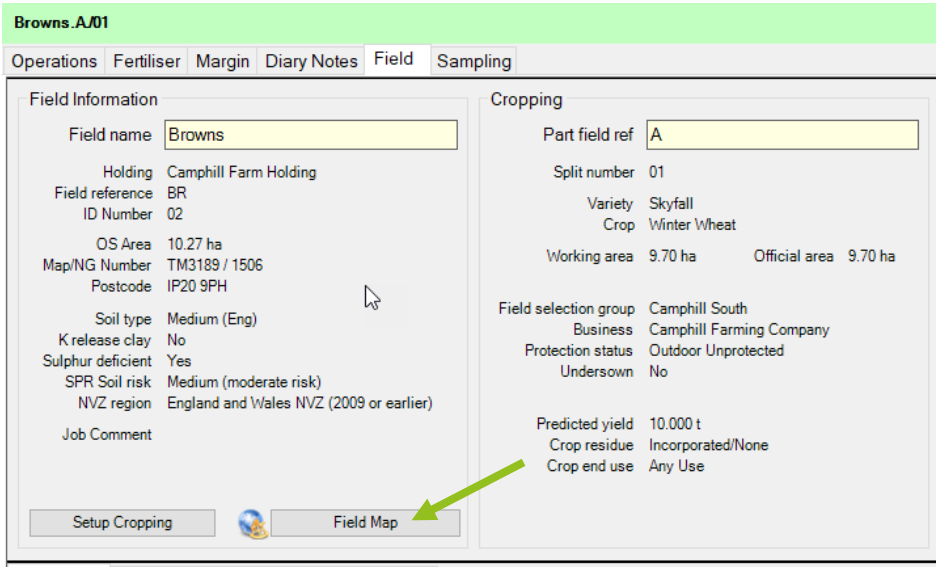


View is scaled to fit all fields in group



Improved visibility

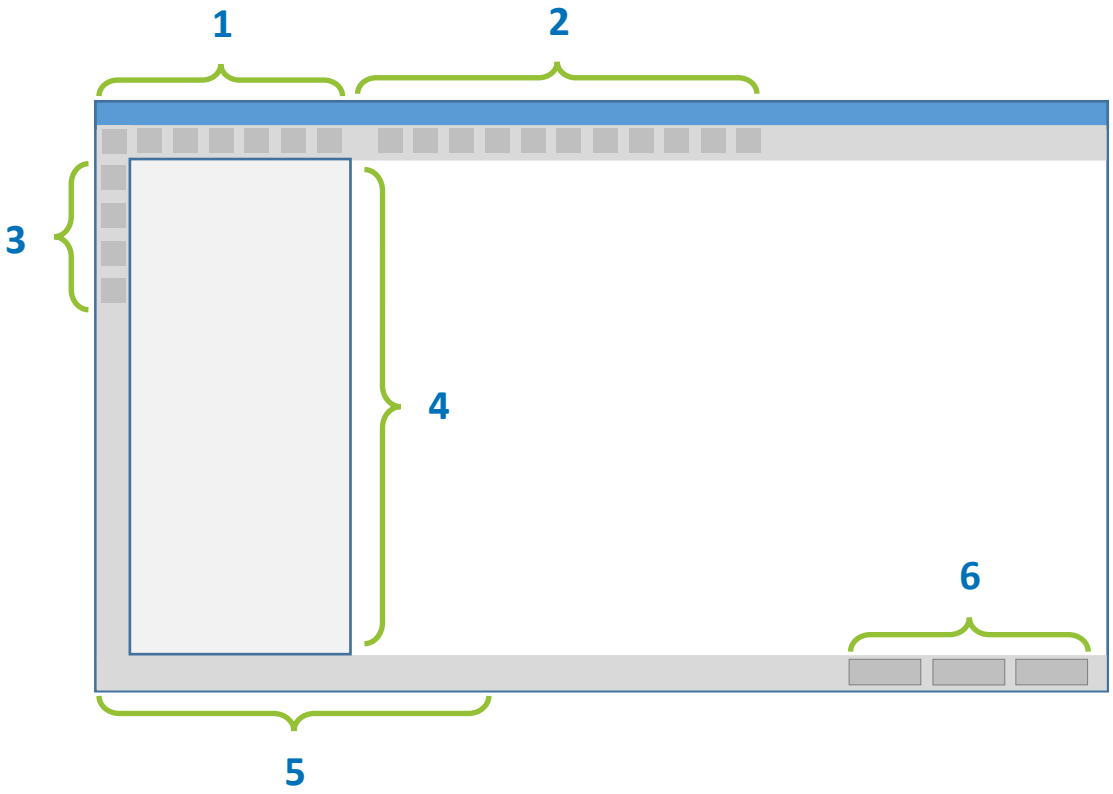
The field map is opened from the cropping record in the fields module.



If no field boundary is present for the field, the button indicated will instead say 'Setup Boundary Map'. For more information on adding field boundaries to a field, see Field Boundaries (p.14).

The mapping window

Whether you are viewing a field map or the farm map, the layout of the mapping window is the same:



Location	Item	Functions
1	Utilities	Save, print, zoom, etc
2	Tools	Available options change depending on which mapping layer is on top (only visible where scale below 1:30,000)
3	Menus	Slightly different between field map and farm map (see below)
4	Menu information	What is displayed in this panel is controlled by selection of menu icons in 3
5	Map information	Displays information including zoom level, top layer name, and cropping year
6	OK, Cancel, and Save buttons	

The four menu icons shown at 3 on the diagram are as follows:

Active tools

Layers

Farm map: field groups

Field map: job data

Geoanalysis

A full breakdown of each menu screen can be found in Appendix 1 (p.38).
A full breakdown of universal mapping tools can be found in Appendix 2 (p.42)
A full breakdown of cartographic layer tools can be found in Appendix 3 (p.44)
A full breakdown of field zone layer tools can be found in Appendix 4 (p.47)

Layers

Layers is the term used throughout Gatekeeper mapping to describe the different 'sheets' of information. Multiple layers may be switched on and stacked underneath each other to display different sets of information. Therefore any information you wish to display on its own should be added to its own layer.

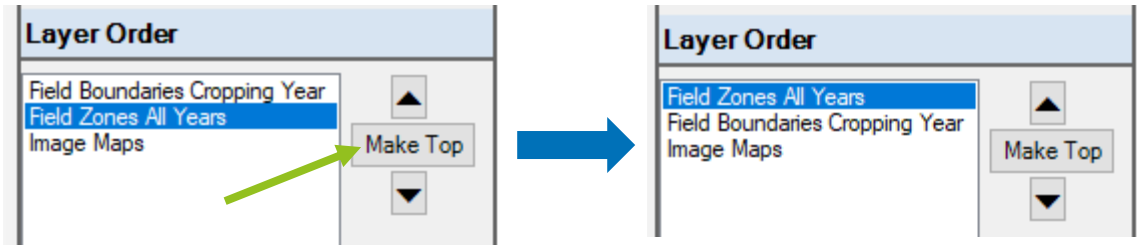
There are two ways to view multiple layers in Gatekeeper, and these may be combined.

Fading layers

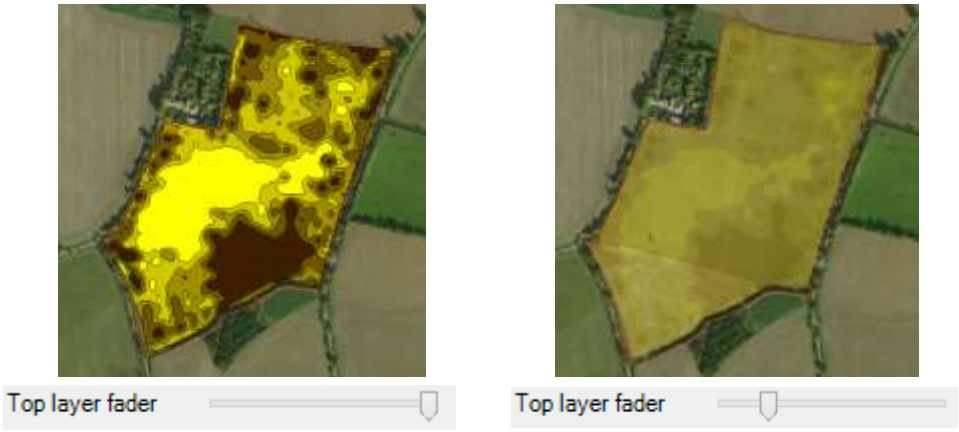
You can manipulate layer transparency in order to view two images or entities overlaid over one another:

Layer 1 *Layer 2* *Both layers visible*

To use the transparency feature, ensure that the layer you want to adjust is on top. Select the layers menu and then use the 'Layer Order' box to adjust layers:



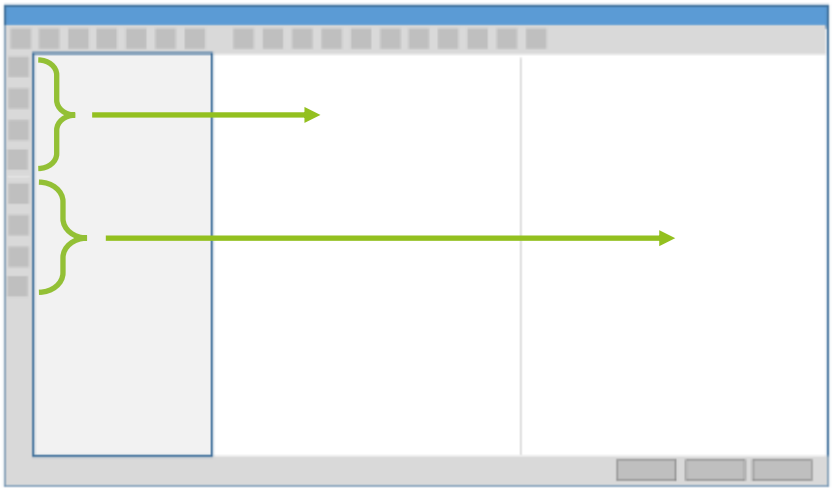
Underneath the layer order box, use the 'Top layer fader' tool to adjust transparency by dragging the marker to the left:



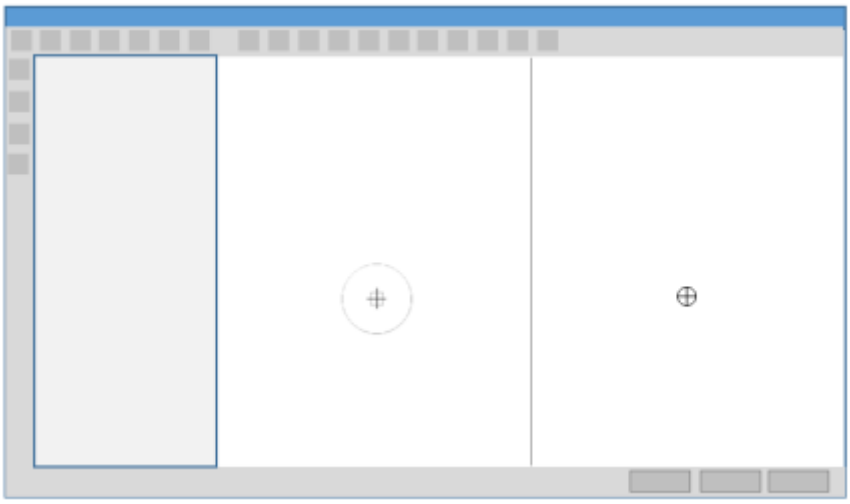
Splitting the screen

The second method is to split the mapping window, and view two maps side by side. To do this, click on the 'Show second library map' button which is in the top left hand corner of the mapping window:

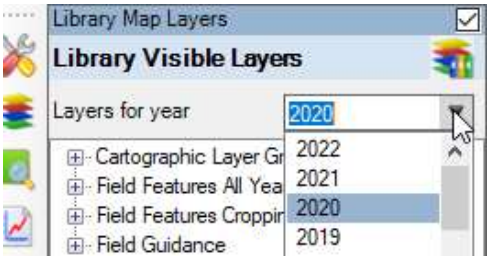
The screen will now be split in two, and the four vertical icons are duplicated. The top four control the left hand side of the screen, and the second set of four control the right:



The cursor is also duplicated, which allows you to identify the same point on both maps:

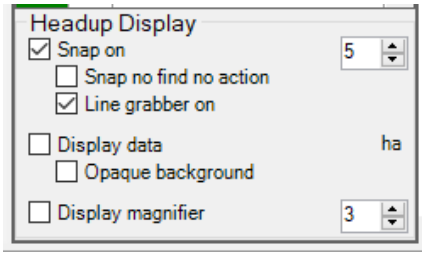


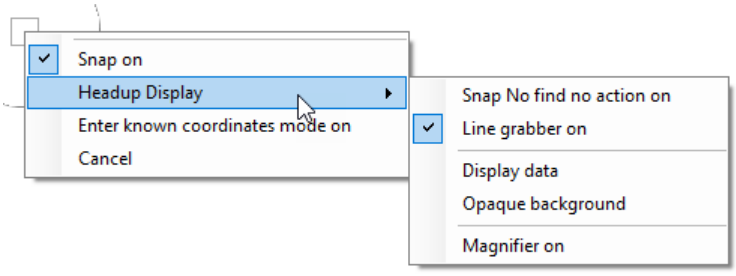
Whenever the library map mode is in use, you can specify which year's data should be displayed in the second map pane. This can be useful for referring to previous cropping, field boundaries, etc. To change the lookup year, go to the Library Map Layers menu and pick the required cropping year from the dropdown list.



Cursor options

The following options affect how the cursor interacts with the mapping window. They can be accessed either through the right click menu, or by going to the active tools menu and using the 'Headup display' section at the bottom of the screen.



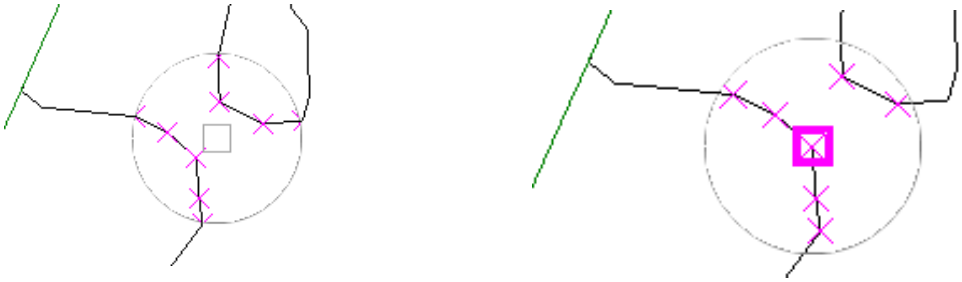


Snap on

The snap function makes it easier to pick up points in an entity. When snap is switched on, a snap box appears around the cursor:

Cursor – no snap *Cursor – snap turned on*

When the snap function is switched on, any snap points in an entity display as purple crosses. When the cursor is over a snap point, the box around the cursor turns bold to indicate the lock:



Snap points visible *Bold box indicates snap point underneath cursor*

The snap tool can be turned on by either:

1. Right clicking and selecting 'Snap On'
2. Going to the active tools menu, and under the headup display section putting a tick in 'Snap on'.

Adjusting the number next to the snap option changes how far away from the cursor the snap function will work. The smaller the number, the more sensitive the snap box.

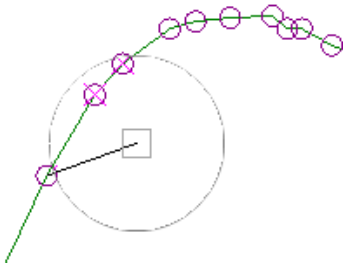
Snap no find no action

When this option is selected, the cursor will not interact with the mapping window unless it is over a snap point. If you are trying to use a tool in the mapping window but nothing happens when you click, check this option has not been turned on.

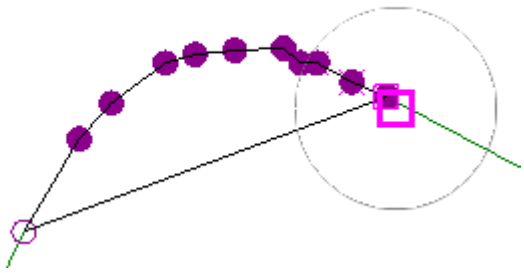
Line grabber

The line grabber function allows you to copy all the points of an existing entity without having to select them all individually (to trace and copy a line).

1. Turn the line grabber on by either:
    a. Right clicking and selecting 'Headup display' and then 'Line Grabber On' from the menu, or
    b. Going to the active tools menu, and under the headup display section putting a tick in 'Line Grabber on'.
2. Click on a snap point of the line you wish to copy
3. As you move your mouse along the line, you will see purple circles have appeared at every point in the line where a snap point exists. You do not have to trace the line exactly for the line grabber to work, as long as the purple circles are filled they will be copied. Left click to select all the highlighted points.

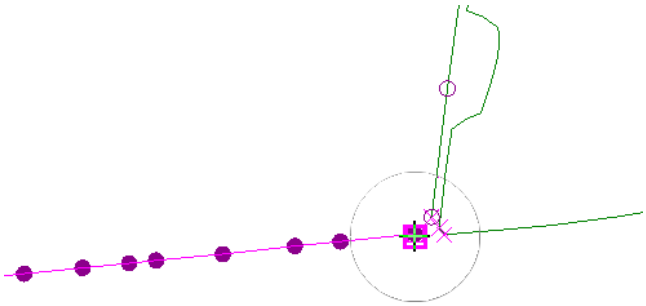


After the first click, all points in the entity have a circle around them

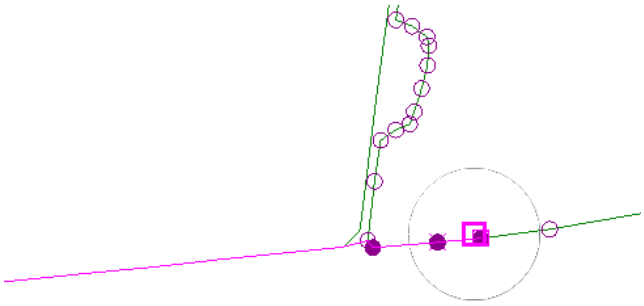


When circles are filled, they have been selected and will be copied with the next left click

The line grabber only acts on one entity at a time. This means that if you are copying lines from two separate entities (for example, measuring along the edge of one field, and then continuing along the edge of the next field), at the point you need to move from the first entity to the second, you will need to click onto the first available snap point of the second entity for the line grabber to move focus:



Line grabber active on left field – snap points of right field are visible but not selected



First click on snap points of right field shifts line grabber to its snap points

Display data

With this option selected, map information is displayed around the cursor. The exact information varies depending on the top layer and what kind of entity is under the cursor.

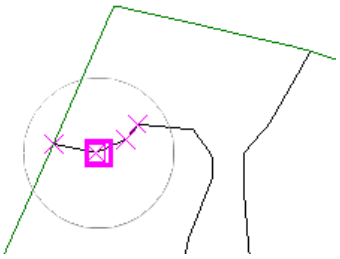
Putting a tick in 'Opaque background' puts a white square behind the display data to make it easier to read.

Turn on display data by either:

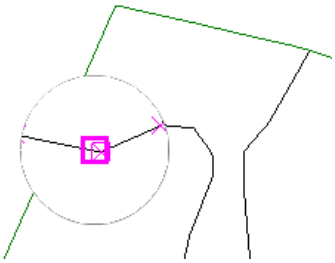
1. Right clicking and selecting *Headup Display* and then *Display data,* or
2. Going to the active tools menu, and under the headup display section putting a tick in 'Display data'

Display magnifier

The display magnifier applies a magnification to the area within the circle which surrounds the cursor.



Without display magnifier



With display magnifier

It can be turned on by either:

1. Right clicking and selecting *Headup Display > Magnifier On,* or
2. Going to the active tools menu, and under the headup display section put a tick in 'Display magnifier'

The strength of the magnification is controlled through the headup display section of the active tools menu.

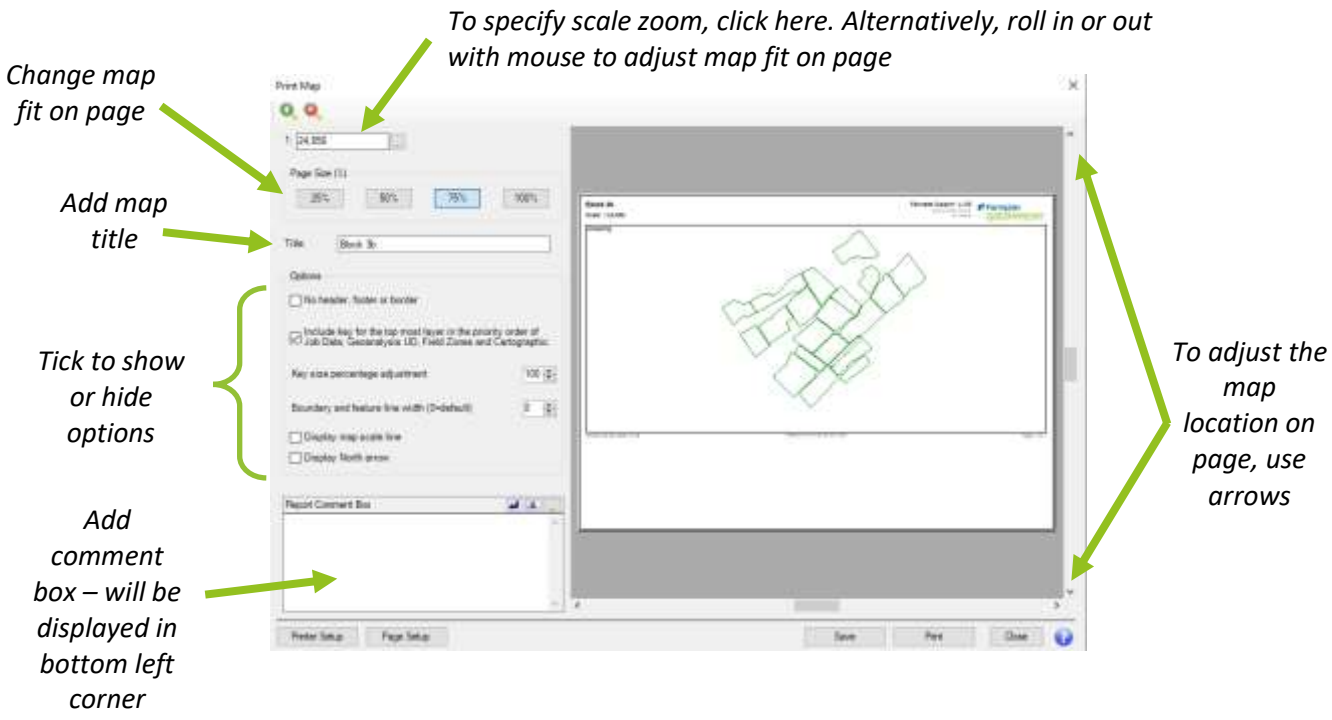
Saving, printing, and sending maps

There are two ways to create a map document from the Gatekeeper mapping module, which can then be saved or printed as required. Alternatively, it is also possible to run a map report from the fields module, which can then be saved, printed, or exported as required.

Save or print the current view from the mapping window

To save or print the map as it appears in the mapping window, use the 'Print' icon:

In the window that opens, the following adjustments can be made if necessary:



Save or print a map report from the mapping window

The second option for printing and saving from the mapping window is to create a map report. This option can be particularly useful where you have multiple field groups, because Gatekeeper will automatically scale each page of the report to the extent of the fields in each field group.

To access map reports, click 'Reports':

Select from the available options as required and then click 'Run Report'.

Save or print a map report from the fields module

If you would prefer to view maps on a field by field basis, the selection of 'Field Map' type reports available in the field module may be more useful.

If you wish to create a map report that displays cartographic layers, you will need to ensure these layers are visible in the map window before following the steps below. Cartographic layer contents are not clipped to the field boundary, so any entity outside a field boundary but in close proximity will still be visible.

To run a field map report:

1. Go to the fields module
2. Click *Reports*
3. Select a 'Field Maps' report from the list – e.g., 'Field Maps (Full)'
4. To determine which mapping data should be displayed, click on the 'Mapping' subtab and:
    a. Select tick box options as required to show or hide map scale, north arrow, Bing backdrops, etc
    b. Tick 'Show cartographic layers' if you wish to display cartographic layer data
    c. If data from field zone layers is to be displayed, scroll the grid at the bottom of the page until the columns 'Field Zones All Years' or 'Field Zones Crop Year' are visible and then:
        i. Double click in the required column to activate the dropdown list
        ii. Select the layer required from the list
5. To specify which fields should appear in the report, click on the 'Options' subtab and click 'Selected Fields' to pick the fields required
6. Click *Run Report*

The options selected at step 4 will be remembered next time you run the selected report, so you will only need to follow step 4 in subsequent times if you wish to change the options selected.

Users with the precision farming actual or John Deere devices modules will have additional map display options not detailed in the steps above, which can be used to create field maps to display precision farming data. For more information, please refer to the appropriate handbook.

Sharing map data with other Gatekeeper users

In addition to the save and print options detailed above, map data from specific layers may be exported to another Gatekeeper user, depending on the layer type.

For exporting cartographic layers or styles, see Exporting information from cartographic layers (p.27).

For exporting field zone layers, see Exporting data from field zones layers (p.32).

For exporting geoanalysis layers, see Sharing geoanalysis queries (p.37).

Field boundaries

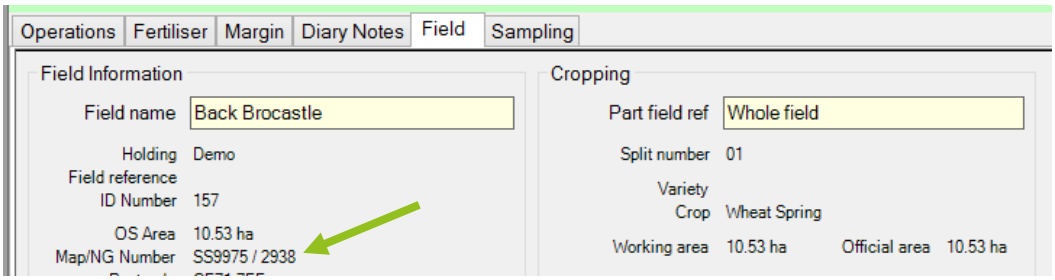
- A field's boundary is the starting point of all mapping activities in Gatekeeper.
- A field boundary may be drawn manually into Gatekeeper, or imported through the devices module.
- Where a field is split (has more than one cropping record), each split part has its own boundary.
- Changes to the field boundary will affect the field in every year it shares the same field region.

Adding field boundaries manually

The following steps are to add a boundary to a whole field - if you wish to add a boundary to a field which is split, please see Split Field Boundaries.

To manually add a field boundary for the first time:

1. Go to the field in the fields module
2. Click on the *Field* tab
3. Ensure the map sheet and NG number have been entered in the cropping record:



   If they have not, click *Setup Cropping* and enter this information on the field details screen. (If this information is not known, see 'if the map sheet and field number are not known' below.)
4. Click *Setup Boundary Map*
5. In the window that opens, ensure the option 'Use MS Bing Maps Field Finder' is selected
6. In the window that opens, your field will be shown in the middle of the screen. Click *Create Boundary* to proceed.
7. A new window will open, still with your field in the centre. You can zoom the map to get closer if required by scrolling your mouse wheel. Place the mouse cursor over where you wish to start drawing the boundary, and left click.
8. A new window will open, with your field list on the left hand side and the field name highlighted. To confirm this is the field you are adding a boundary for, click *OK*.
9. Continue left clicking around the field. (See below for if you make a mistake)
10. When you have finished, right click and then select *Finish and allocate field boundary*.

After adding a field boundary, the field's name will be visible twice – this is not an error. The location of the two captions visible is where labels may be added when geoanalysis layers are created. The labels will only be visible while you are editing field boundaries.

If you make a mistake while drawing a field boundary

The following options are available:

a. To cancel the last point you dropped, right click and select *Cancel last point*. This will remove the last point and you can continue drawing.

b. To cancel the last five points you dropped, right click and select *Cancel last 5 points*. This will remove the last 5 points and you can continue drawing (or cancel the 5 before as well).
c. To cancel the edit completely and go back without saving any changes, right click and select *Abort this edit*. This will not save any changes you have made, and you can start from the beginning.
d. Alternatively, if you have made a small mistake, continue drawing the boundary and finalise as per the instructions. You can then use the point editing tools to correct your mistake once the boundary is drawn.

If the map sheet and field number are not known, or the field is outside the UK

Follow steps 1-5 as above. When you have completed step 5, the location of the field will not be displayed. Instead:

a. In the window that opens, you will see a map of the UK. To make the next steps easier, you may wish to change the backdrop to 'Aerial with Labels' or 'Road' from the Bing maps dropdown option on the left of the map.

b. Use the scale to box tool to zoom in on the field location. This tool is not click and drag – make a left click to drop one corner of the zoom box, ensure you have released the mouse click, and pull the box. When it is the correct size, make a second left click and the map will zoom to the box you have just drawn. Continue doing this until you have located the field, and then click *Create Boundary*.
c. Follow from step 7 above.

If you are adding many fields in one go

It is not necessary to add every field individually using the field finder function. Add the two fields which are geographically the furthest apart from each other using the method on page 14, and then stay in the farm map window and follow these steps:

a. Centre the map on the next field you wish to draw a boundary for
b. Click on the field boundary tool (green square).
c. Place the cursor over where you wish to start drawing the boundary, and left click.
d. A new window will open, with the field list on the left. Select the field you wish to draw a new boundary for, and click *OK*.
e. Continue left clicking around the field.
f. When you have finished, right click and then select *Finish and allocate field boundary*.
g. Repeat from c.

If you are adding a field which has an internal exclusion

For features such as a pond, wood, or permanently non-cropped area:

a. When you right click at stage 10, select *Start internal island*
b. The boundary you were drawing will still be visible, but your cursor is no longer attached to it. Make a left click at the first point you wish to exclude.
c. Left click around the exclusion until it is surrounded.
d. Either:
    i. Right click and select *Finish and allocate field boundary*, or
    ii. Right click and select *Start internal island* to start another island, and repeat as necessary
e. The field boundary you have just drawn will be visible in a solid red line, and the exclusion will be surrounded by a dashed red line.

Example of a field with in-field features marked as internal islands

If you are adding a field which has two entirely separate boundaries

For example one field which is completely divided by a track or road:

a. Follow the instructions to draw around one side of the field.
b. When you right click at step 10, select *Start sub polygon*
c. The boundary you were drawing will still be visible, but your cursor is no longer attached to it. Make a left click at the first point you wish to make part of the boundary of the second area.
d. Left click around the area until it is surrounded.
e. Right click and select *Finish and allocate field boundary*.
f. The two boundaries you have just drawn will be visible with solid red lines, and both are associated with the same field.

Example of a field with a single field boundary and associated sub polygon.

Adding field boundaries based on a previous boundary

Where a field has previously had a boundary, and you wish to copy this entirely or in part to a new boundary for the same field, change the field region and then follow the steps below:

Copying a field boundary from a previous region

In the mapping window, with the field location visible and field boundary cropping year layer on top:

1. Select the *Field Boundary Polygon Tool*
2. Left click anywhere on the map

3. In the screen that opens, select the field you wish to add a new boundary for
4. On the right of the screen, select the mode option Use Existing Region Boundary 'Copy'
5. From the dropdown list, select the previous boundary to copy
6. Click *OK*

The field will now be visible again with the boundary copied from the previous region.

Importing field boundaries

If you have the mapping module but not the precision actual module, you can import field boundaries in any of the following generic file format types:

- CSV file
- KML file
- SHP file (using either WGS84 or OS co-ordinate projections)

If you have the precision actual or John Deere Devices module, you will be able to import field boundaries from your specific in-cab devices. For more information, please refer to the precision modules handbook.

The steps below assume you have shape files to import. If you are using a different file type, you will just need to navigate to a different node at step 2.

If you are using shape files, please be aware that 'a shape file' is always comprised of at least three separate files: a .shp file, a .shx file, and a .dbf file. You must have all three component files in order to be able to import a shape file.

To import field boundaries:

1. Go to the devices module

2. From the list on the left hand side, select *Farmplan/Generic > Field Boundaries > Boundary Shape SHP (WGS84)*
3. Click *Device Sync*
4. On the devices tab, you may wish to untick the 'Move source to archive after import' option.
5. Go to the import tab
6. Using the '…' icon next to path, select the folder where your files are saved.
7. Match the files to the fields you want to import them against by double clicking in the 'Gatekeeper destination field' column.
8. A new window will open with the field list on the left hand side: select the required field and click *OK*. When you return to the import screen, your field will have a tick in the 'Import' column.
9. *Optional:* if you need to preview a file's contents to check them, put a tick for that field in the column 'Map Preview' and click *Map Preview.* To close the preview, click *Close*.
10. Once you have matched the files and fields, click *Import with Preview*.
11. You will be shown each boundary in turn; to accept and import, click *OK* and the next field will show.

Once imported, field boundaries may be edited as required.

Split field boundaries

All fields in Gatekeeper have the potential to have two boundaries associated to them; the cropping year boundary, and the whole field boundary. If a field is not split, these two boundaries always look the same.

Once a field is split (the cropping record is divided), the cropping boundary layer allows you to associate a boundary to each cropping record of the field. The whole field layer is the joined cropping boundaries:

Part A cropping boundary

Part B cropping boundary

Whole field boundary

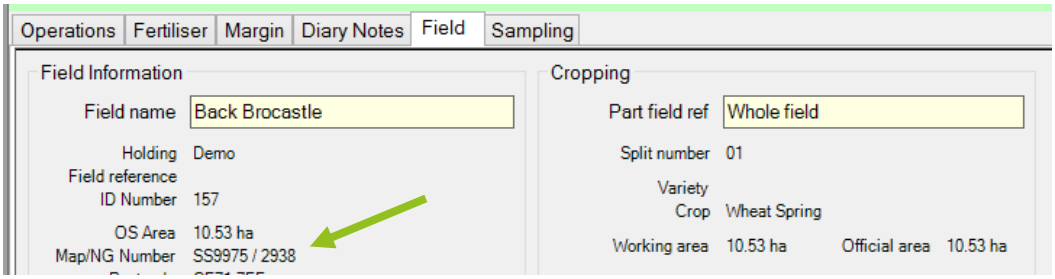
The steps below follow the procedures necessary to either: add field boundaries to a field that was already split in the cropping record, but did not yet have any boundaries allocated; or to add split boundaries based on an underlying whole field boundary where the field has been newly split.

For all scenarios below - the measuring parallel line tool is often useful when adding split field boundaries for game cover, environmental schemes, etc. For more information on the measuring parallel line tool, please see Appendix 2 (p.41).

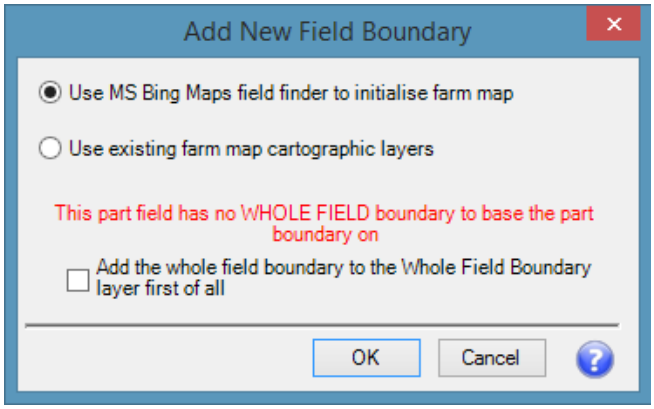
If you are adding a boundary for the first time to a field which is already split

You will first need to add the whole field boundary, and then the separate cropping boundaries:

1. Go to the field in the fields module
2. Click on the *Field* tab
3. Ensure the map sheet and NG number have been entered in the cropping record:



   If they have not, click *Setup Cropping* and enter this information on the field details screen. (If this information is not known, see If the map sheet and field number are not known, p.15)
4. Click *Setup Boundary Map*
5. In the window that opens, ensure the option 'Use MS Bing Maps Field Finder' is selected. You will also see a warning message:



Place a tick in the box 'Add the whole field boundary' and click *OK*.

6. In the window that opens, your field will be shown in the middle of the screen. Click *Create Boundary* to proceed.
7. A new window will open, still with your field in the centre. You can zoom the map to get closer if required by scrolling with your mouse wheel.
8. Left click to drop the first point in the whole field boundary. A new window will open with your field list on the left hand side and the field name highlighted. To confirm this is the field you are adding a boundary for, click *OK*.
9. Continue left clicking around the whole field.
10. When you have finished, right click and then select *Finish and allocate field boundary*.
11. The whole field boundary will be visible in off-white.
12. Select the layers menu from the left hand side, and in the layer order box, move *Field Boundaries Cropping Year* to the top.
13. Follow one of the scenarios below:

If the field is split into two parts along a straight line

The split function lets you draw a line to divide the underlying whole field boundary, and specify which cropping records should be linked to the boundaries on the left and right of that line:

a. Make sure the whole field boundary is visible and centred in the mapping window.
b. Click on the field boundary tool (plain green square) and then click once on the map window (it doesn't matter where).
c. A new window will open. Select the first split part of the field from the list on the left hand side (e.g., Field Part A).
d. Under the heading 'Use Existing Region Boundary', select the option *Split.* The preview box will now show you the whole field boundary shape.
e. The box 'Left of Splitting Line' will have the field name you have just selected in it. To specify which boundary should be put on the right of the line you are about to draw, put a tick in the box 'Right of Splitting Line' and this will enable the dropdown list. Select the second part of the field.
f. Click *OK* and you will be returned to the farm map view.
g. Make a left click in line with the splitting line you wish to draw, <u>but outside the field boundary</u>.
h. Either,
    i. If the division is along a straight line, pull the cursor so that the line divides the field at the point you wish to split the boundary, and then make a second left click <u>outside the field boundary.</u>
    ii. if the division has an angle in it, click inside the field at the point you wish to change the direction of the line, and then make a final left click <u>outside the field boundary.</u>

i. *Optional:* if the splitting line is not quite in the right place, right click and select *Drag splitting line to final position*. The line will be duplicated and move with your cursor, and you can drop it where you want it to be.
j. Right click and select *Split polygon along the line.*

If the field is split into two parts, but the split function is not appropriate

Where a field is split into two parts but it is not possible to use the splitting function to automatically divide the field based on a single drawn line, you can draw the two boundaries in manually.

It may be useful to refer to the whole field boundary and use measuring tools to plot where split field boundaries are expected to be. The measuring lines can then be used to draw the split field boundaries.

If the field is split into three or more parts

It is only possible to use the split function to assign one part of the field. The remaining parts must be drawn, but it is possible to copy underlying shapes and lines.

If you wish to use the splitting line to allocate the main part of a field, follow the steps above but do not select a cropping record to use the other side of the splitting line in step 18.

To free-draw a field boundary, follow the steps to manually add a field boundary on page 14. You may find it useful to use the line grabber function to copy the underlying parts of the whole field boundary that apply.

If a field has been split in previous cropping years

At the time you split the cropping record (in the fields module, not the mapping module) you will be offered the change to re-use a previous field region and thereby associate any boundaries that are the same.

For any split field parts which are a new shape, chose to add a new part field region to start with a clean sheet, and follow the appropriate steps above to add the new boundary.

Editing field boundaries

Once a field boundary has been drawn or imported, it can be altered if required.

It is essential to understand that changes made to a field boundary will affect that boundary across multiple cropping years, not just in the current cropping year. If you wish to make a change that only applies from this point forward, or to certain years only, you must change the field region before making any changes.

To edit a field boundary, open the farm map or field map as required, and ensure the field boundary layer is on top. In the tools bar you will see a number of tools with purple circles in the icons; these are the point editing tools.

1 2 3 4 5

Icon	Tool	Details
1	Insert points	To add more points into an existing line (for example, to smooth a corner)
2	Move point	To pick up existing points in a line and change their position
3	Move entity	To pick up an entire entity and change its position (rarely appropriate for field boundaries)
4	Delete point	To delete an existing point from a line
5	Delete entity	*Does not work on field boundaries as they cannot be deleted – see below.*

Generally speaking, all point editing tools are much easier to use if you have the Snap On function switched on. This means you can quickly identify the points in an existing boundary and adjust them. Check snap is switched on either by looking in the Active Tools menu, or by right clicking in the mapping menu and seeing if Snap On has a tick beside it. For more details on snap, including adjusting the sensitivity, please see Snap On.

Field boundaries cannot be deleted once they have been added, but it is possible to prevent a field boundary being visible by changing the field region. For more details, please see Removing a Field Boundary, (p.23).

For more information on using mapping tools, see Appendices 2-4 (pp.42-48).

Field regions

- The field region is what connects the boundary (shape of the field) to the cropping record (field activities).
- If you edit a field boundary, it will change in every year where the cropping record uses the same field region.
- If you wish to make a change to the field boundary that only applies to certain years, or from the current year forwards, it is necessary to change the field region *before* making any changes.
- It is the same process to follow if a field has previously been split into two parts and is split into two different parts.
- These steps must also be followed if you are importing new boundaries captured with precision farming equipment and wish to update the boundaries in use.

For example, if part of an existing field is permanently removed in 2021:

Up to 2020, original field boundary

From 2021, new field boundary with new region

Alternatively, it may be the case that a field is split in two different ways in different cropping years:

2018, field split

2019-2020, whole field

2021, field split differently

In both scenarios, changing the field region allows a different boundary to be associated to the cropping records.

Regions are controlled through the cropping record, not in the mapping windows. To change field regions:

1. Open a field's cropping record (*Setup > Fields* and double click to open the required field)
2. Click on the *Region* tab
3. Click *Swap Field Region*
4. Click *Setup Field Regions*
5. To change the boundary for a whole field, click *Add Whole Field Region*. To change the boundaries for part field cropping records, click *Add Part Field Region* for the number of new regions required.
6. If you use the buffer zone information on the field records, you will need to reselect the information for the new region(s).

7. If you are setting up part field regions, you may wish to edit the letter assigned to the region so that A and B are always the current field regions. To do this:
    a. From the left hand side of the screen, click on the region currently labelled A.
    b. In the 'Part Field Reference' box, change A (for example, make it 'A2', 'A.', or 'A 2020')
    c. From the left hand side, click on the new region you wish to make A.
    d. In the 'Part Field Reference' box, change the current region label to A.
    e. Repeat for any other regions as required using B, C, D, etc.
8. Once you have the required region(s) set up, click *OK* from the next two screens.
9. Click *OK* to close the cropping record. On the field tab, the 'Field Map' button will now say 'Setup Boundary Map'. Click to add the new boundary, or import the boundary from a shape file (or, for precision module users, GPS unit).

Removing a field boundary

If you are changing the field region to remove a field boundary because you do not want a field to have a boundary or appear on any maps, use the same steps as above to remove the previous boundary, and do not add a new boundary.

Cartographic layers

- Cartographic layers are ideal for drawing reference maps – for example, NVZ maps, estate maps, shoot maps, etc.
- Although they are visible in both the farm map and field map, cartographic layers can only be edited through the farm map.
- Cartographic layers are not clipped by the field boundary (if you view a cartographic layer through the field map, you will see map data outside the field as well as inside it).

Setting up cartographic layers

Ensure you are working in the farm map and not the field map before proceeding – cartographic layers can only be set up and edited from the farm map.

To add a new cartographic layer from scratch

1. Select the Map Layers menu
2. Click *Setup Cartographic Layers*
3. *Either:* select an existing layer group
   Or: click *Add Group* to add a new group, and enter the name of the group.
4. With the layer group selected, click *Add Layer*
5. Enter a layer name
6. If required, edit styles:
   a. Click onto the first style name ('Black – Solid Line – No Fill')
   b. If required, change the style name (this is what will appear on mapping keys)
   c. If map total reports will be required, enter a style rate (for more information, see Reporting from cartographic layers [p.26])
   d. On the Line subtab, change the line colour – you can use the alphabetical list, or the '…' selector icon for a standard Microsoft colour picker.
   e. If you want to change the line pattern, select from the dropdown list
   f. If you want to change the line thickness, change the selector under 'Width' to 'Scale m' and increase the number.
   g. On the Fill subtab, either select a colour or use the 'Copy Line Colour' button to copy the colour you set for the line in step c.
   h. If you want polygons to be filled, select either 'Solid' or 'Hatch'. If you select 'Hatch', select the pattern from the dropdown list.
   i. If you want to associate a colour and size for text labels, go to the Text subtab and select a colour or use 'Copy Line Colour'. If required, change text size or font, style, or add a surrounding box.
   j. Repeat for other styles as required. If you need more than the 4 default styles, click *Add Style*.
7. Once all styles are correct, click *OK* to return to the mapping screen. To turn on the layer you have just selected, open the cartographic layers group and select your layer.

To copy an existing cartographic layer including contents

1. Select the Map Layers menu
2. Click *Setup Cartographic Layers*
3. Select the layer you wish to copy
4. Click *Copy This Layer*
5. Click *Yes* to the warning message

6. The layer will be duplicated, with the name 'Copy of [original layer name]'.
7. Click *OK* to save and close the setup screen. The layer created will be visible in the cartographic layers groups.

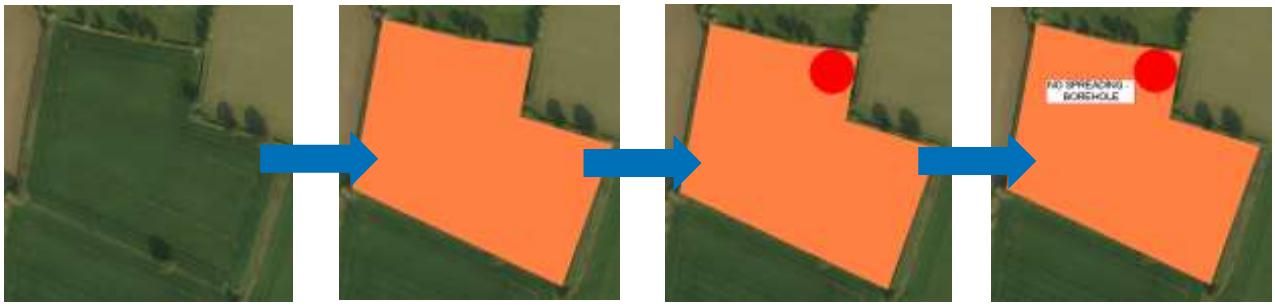
To copy existing cartographic layer styles into a new, blank, cartographic layer

1. Select the Map Layers menu
2. Click *Setup Cartographic Layers*
3. Select the layer containing styles you wish to copy
4. Click *Add Blank Layer and Copy Styles*
5. In the screen that opens, select the styles you wish to copy from the list on the left hand side. You can select styles from different layers at this point
6. Click the single right facing blue arrow to select styles
7. Click *OK* to copy styles
8. A new layer with selected styles will be created. Change the layer group if necessary, and click *OK* to return to the mapping screen.

Drawing onto cartographic layers

1. Ensure the layer you wish to draw on is turned on and at the top of the layer order. If you will want to trace elements from another layer, ensure it is the second layer.
2. Open the active tools menu
3. Click on the tool you wish to use
4. Select the style you wish to draw with
5. Draw away, remembering the right click menu to finish or adjust entities.

Entities drawn on cartographic layers display in the order they are drawn. Where entities will overlap you may need to consider the order they are drawn in. For example, if the field below is being included in an NVZ risk map and requires a no-spread exclusion zone and labels, these must be drawn on top of any other data to display:



Where you need to refer to underlying field information to create your map, it may be useful to adjust the layer transparency (p.7) so that you can see through what's already been drawn.

If you will be using cartographic layer reporting to total areas or lengths of entities drawn with particular styles, you may need to consider the impact on this of overlaying entities. It may be prudent to use internal islands for larger entities to ensure areas are not double counted.

A full breakdown of cartographic layer tools, their functions, and tips for use, can be found in Appendix 3 (p.44).

Reporting from cartographic layers

Cartographic layer reports can add up the length or area of entities drawn on them, broken down by style. To use this function, styles must be given a value:

1. Go to the map layers menu
2. Click *Setup Cartographic Layers*
3. Select the required layer and the first style
4. In the box 'Rate used by the map report with totals option', enter the value you wish to allocate to the style. If you want the report to count length or area, enter a '1'. If you want the report to calculate a point value (for example, points allocation of stewardship options), enter the points value per whole unit (km or ha).
5. Repeat for each style
6. Click *OK* to save and close

From the map layers section of the layers menu, ensure the cartographic layer is on top. You can then run a report which will show the map totals. Click on the 'Reports' icon:

1. Select portrait or landscape from the options on the left hand side
2. *Optional*: for field groups to be separated into separate maps, tick the option 'Each field group in a separate map'
3. From the box on the right hand side, select which field group(s) you want to run the report for.
4. Under the Maps heading, select full page or half page maps (or, for totals but no map, select 'No maps just sub reports')
5. Under the Sub Report heading, select 'Top layer Map Totals sub report'
6. Click *Run report.*

To display a map key as a separate section of a mapping report

It is possible to run a map report that displays the mapping key separately from the map view if required (for example, to help make it easier to read key information when the map is printed). To view the map key as a separately when running a report, ensure the required cartographic layer is on top and:

1. Click on the 'Reports' icon
2. Select portrait or landscape from the options on the left hand side
3. *Optional*: for field groups to be separated into separate maps, tick the option 'Each field group in a separate map'
4. From the box on the right hand side, select which field group(s) you want to run the report for.
5. Under the Maps heading, select full page or half page maps
6. Under the Sub Report heading, select 'Top layer Key sub report'
7. If you wish the key to be displayed on each map sheet as well, ensure there is a tick in the Include option 'Map key if appropriate'. If you do not wish the key to be displayed on each sheet, ensure this option is unticked.
8. Click *Run Report*.

Importing information

Mapping information provided in certain formats can be imported into the cartographic layers. Commonly this will be whole farm boundaries in a shapefile (sometimes released by the RPA or other regional agency), or ordnance survey map information. In addition, cartographic layer styles can be shared between Gatekeeper users. This includes the import of some 'standard' layer setups available for customers from the Farmplan support team, which have been designed to allow you to quickly add layers for data such as environmental schemes, footpath and drainage locations, and NVZ and manure management information.

Importing map data from a third party

To import information onto a cartographic mapping layer, from the main Gatekeeper screen:

1. Go to *Setup* > *Mapping* > *Import Map Data*
2. Use the '…' icon by the 'Path' line to select where the files are saved
3. From the dropdown list 'File type', select the data type to import. If you are importing OS tile data, select 'Shapefile using Ordnance Survey'.
4. The screen will fill under the 'Data to Import' heading. Put a tick in the Import column for each data line you want to import.
5. Click *Import*. You will be shown each set of data in a map preview window. Click *OK* to accept each time.

If you have multiple sets of data to import, you can choose to import the next set of data onto a new layer or onto the layer you have just created. If you wish to merge the new files onto an existing layer, at the point of import select 'Merge layers by name' from the Options box in the top right of the screen.

To view the data imported, open the farm map window and select the layers menu. Your layers will now be under Cartographic Layer Groups > OS Open Data [or other group].

Importing cartographic layer styles or a published cartographic layer from another Gatekeeper user

If you have been published cartographic layer data from another user, to import:

1. Open the publishing centre
2. Select the required publication to import (data type will be 'Mapping Cartographic Layers')
3. Click *Import Published Data*
4. Click *Import Data*
5. The published data will be shown in a preview screen. Click *OK* to import.

The published data will always be imported onto a new layer.

Exporting information

It is possible to share cartographic layer styles, or the contents of a cartographic layer with another Gatekeeper user.

To export cartographic layer styles

From the mapping screen and layers menu,

1. Click *Setup Cartographic Layers*
2. Select the layer which contains the styles you wish to publish (you must have the layer itself selected, not a style)
3. Click *Publish Styles*
4. Select a recipient to publish to

5. Add a message if required
6. Click *OK*. Your publication will be sent the next time you synchronise or do a send and receive.

To export a cartographic layer including its contents

With the cartographic layer switched on, from the mapping screen, click the publishing icon:

Select from the options as required, ensuring you have 'Layers, styles and map data' selected. Click *OK* and then follow the published steps as above.

Displaying cartographic maps on a job sheet

When creating job sheets in the planning or recommendations module, it is possible to include maps from cartographic layers. For example, you may wish to include a map of no spread zones when creating a job sheet for manure spreading.

To select the cartographic layer to display in job reports

The required cartographic layer must be switched on via the field map – it is only necessary to do this for one field, not all fields in a job:

1. Go to the fields module
2. Select a field that is in the job
3. Go to the *Field* tab
4. Click *Field Map*
5. Go to the layers menu, and switch on the layer you want to display
6. 'OK' to save and close.

To include a map for each field:

Ensure you have followed the steps above to select the required layer, then:

1. Go to the planning module
2. Select the plan
3. Click *Reports*
4. Select 'Work Plan Field With Maps' from the left hand side
5. Click on the *Mapping* subtab
6. Put a tick in 'Show cartographic layers'
7. Click *Run Report*.

To create a single map for each plan or job:

Ensure you have followed the steps above to select the required layer, then:

1. Go to the planning module
2. Select the plan
3. Click *Reports*
4. Select 'Work Plan Farm Map' or 'Work Plan Farm Map Landscape' from the left hand side
5. *Optional:* if you want to create a single map for the whole plan, put a tick in 'Show data for all jobs in one map'
6. Click on the *Mapping* subtab
7. Put a tick in 'Show cartographic layers'
8. Click *Run Report*.

Field zone layers

- Field zone layers are ideal for recording field specific information – for example, soil types or areas of weed infestation.
- Field zone layers are split into two types. 'All Years' layers are available to the field throughout different cropping years, while the contents of 'Cropping Year' layers are specific to the cropping year they are entered against.
- For users with the precision farming actual module or John Deere devices module, it is possible to import zones collected on precision farming equipment, or provided by soil services providers, into field zone layers.
- For users with the precision farming target module or John Deere devices module, it is possible to reference field zone layers using the target grid generator to create variable rate application maps.

Setting up field zone layers

Field zones may be set up through the field map or farm map as required. However, as field zones must be connected to a field, anything you draw must be within a field boundary.

There are a number of pre-existing field zone layers present in mapping, or you can add your own layers as required. The first time you use a layer, you must select what zones you wish to be able to use on each layer; the next time you return to the layer, it will already have those zones available for use.

To add a new field zone layer

From the main Gatekeeper screen (not the mapping window):

1. Click *Setup > Headings*
2. From the list on the left hand side, navigate to *Map Zones and Features* and then either *Field Zones All Years* or *Field Zones Crop Year* as appropriate.
3. Select an existing heading type (e.g., 'Soil Types')
4. Click *Add Heading*
5. Enter a name for the new layer you wish to add (e.g., 'Soil Texture')
6. Click *OK* to save and close. The layer will now be visible in your mapping windows.

You can also hide any default layers that you don't wish to use in this menu: follow steps 1-3 as above, and then select the layer you wish to hide. Select the *Inactive* option, and click *OK* to save and close. The layer will not be visible in mapping.

To setup a field zone layer for first use (add zones required)

From the mapping window:

1. Select the map layers menu
2. Expand either *Field Zones All Years* or *Field Zones Cropping Year 2018*.
3. Select the layer you wish to draw on
4. From the 'Layer Order' section, move your layer to the top.
   Please note: when you switch on a field zone layer, your specific layer name (e.g., 'Soil Types') will not be visible – the layer is always shown as Field Zones All Years *or* Field Zones Cropping Year *depending on the type selected.*
5. Click on the active tools menu
6. Click *Select Zones*
7. Click *Pick Zone Names*

8. In the screen that opens, click on the small 'Group' button on the top left hand corner. This will divide the available zone types into groups.
9. Click on the plus next to zone groups to view the pre-set zone options. Then either:
    a. If suitable, select the zones you wish to use and send them to the right of the screen using the single blue right arrow, or
    b. Setup additional zones:
        i. Click *Setup Zone Names*
        ii. *Optional:* Click *Add Group* to add an entirely new zone group
        iii. Select the relevant group from the list on the left hand side
        iv. Click *Add Zone*
        v. Enter a zone name and if required, change the allocated colour
        vi. Repeat as required
        vii. Click *OK* to save and close

    Select the zones you wish to use on the layer as in (a) above.
10. Click *OK* twice to close the zone setup screens.

Drawing onto field zone layers

It is only possible to view one *Field Zones All Years* or *Field Zones Cropping Year* layer at a time. This means you cannot trace or copy entities directly from one *Field Zones* layer onto another.

As you can export and import data from field zone layers, this may be a solution. Alternatively, if this is not suitable, it may be necessary to temporarily copy an entity from one field zones layer onto a cartographic layer, and then onto a different field zones layer.

To draw onto a field zone layer:

1. Ensure the layer you wish to draw on is turned on and at the top of the layer order. If you will want to copy entities from another layer, ensure it is the second layer.
2. Open the active tools menu
3. Click on the tool you wish to use
4. Select the style you wish to draw with
5. Draw away, remembering the right click menu to finish or adjust entities.

A full breakdown of field zone layer tools, their functions, and tips for use, can be found in Appendix 4 (p.47).

Adjusting the order of entities on a field zone layer

Unlike with cartographic layers, entities drawn onto field zone layers can be re-ordered, so they do not need to be drawn in the order they will eventually appear.

This functionality can be useful if you are tracing from a backdrop or imported image (for example, using the Bing backdrop to trace visible differences in soil), as it means you can start with the smaller details and fill the rest of the field in afterwards. For example:

1. Draw any smaller zones as required
2. Either:
    a. Draw a single zone that includes the entire field by
        i. Right clicking inside field
        ii. Selecting 'Find single sub polygon'
        iii. Right clicking again
        iv. Selecting 'Finish this entity'
    b. Or, freehand draw multiple larger zones that you wish to put underneath the smaller zones. You may wish to make sure you have the snap on and line grabber tools switched on for this.
3. Then, to move the large polygon(s) you have just drawn to sit behind the smaller ones,
    a. Select the tool 'Change Polygon's Z-Order'
    b. Right click over an entity, and select 'Find polygon and move Z-Order to the bottom'.
    c. Repeat if required

When drawing on field zone layers, any overlap between entities does not matter. The zones as they appear on the top layer are active, regardless of overlaps.

Importing data onto field zones layers

Zone data may be imported through the devices module. Please be aware before proceeding that importing data onto any field zones layer will **replace** any data that exists on that layer for that field. It will not be added to existing data.

The steps below assume you have SHP files to import – if you are using a different file type, you will just need to navigate to a different node at step 2.

From the main Gatekeeper screen:

1. Open the devices module

2. From the list on the left hand side, select *Farmplan/Generic > Field Zones/Features > Entity Shape SHP (WGS84).* (If you do not see an expanding tree view, ensure the filters 'Manufacturer' and 'Type' are selected above the device list. If you do not see a specific node, put a tick in the option 'Show inactive and unused manufacturers, types and devices' in the green panel.
3. Click *Device Sync*
4. On the devices tab, you may wish to untick the 'Move source to archive after import' option.

5. Go to the import tab
6. Using the '…' icon next to path, select the folder where your files are saved.
7. Match the files to the fields you want to import them against by double clicking in the 'Gatekeeper destination field' column. A new window will open with the field list on the left hand side: select the required field and click *OK*.
8. In the 'Gatekeeper destination zone/feature' column, double click to select which layer you want to import the zones onto.
9. Click *Import with Preview*. You will be shown each field in turn, click *OK* to accept and import.

Exporting data from field zones layers

Field zone layers cannot be exported in the same way as cartographic layers, but it is possible to export the data on a field zone layer into a generic file type (for example, SHP files) which can then be shared. To export from a field zone layer:

1. Open the devices module
2. From the list on the left hand side, select *Farmplan/Generic > Field Zones/Features > Entity Shape SHP (WGS84).* (If you do not see an expanding tree view, ensure the filters 'Manufacturer' and 'Type' are selected above the device list. If you do not see a specific node, put a tick in the option 'Show inactive and unused manufacturers, types and devices' in the green panel.
3. Click *Device Sync*
4. Go to the export tab
5. Using the '…' icon next to path, select the folder you wish to export to
6. Select the required field groups to export, or tick 'Select all groups'
7. From the 'Map Zone Headings to Export' heading, select the layer(s) to export
8. Click *Export*

Displaying field zone maps on a job sheet

When creating job sheets in the planning or recommendations module, it is possible to include maps from field zone layers. For example, you may wish to include a map of no spread zones when creating a job sheet for manure spreading.

To include a map for each field:

1. Go to the planning module
2. Select the required plan
3. Click *Reports*
4. Select 'Work Plan Field With Maps' from the left hand side
5. Click on the *Mapping* subtab
6. From the grid near the bottom of the page, slide the columns along until you can see the column options 'Field Zones All Years' or 'Field Zones Crop Year' as required
7. Double click into the white box that says 'None'; a dropdown list will appear
8. Select the layer you wish to appear from the dropdown list
9. Click *Run Report*

To create a single map for each plan or job:

1. Go to the planning module
2. Select the required plan
3. Click *Reports*
4. Select 'Work Plan Farm Map' or 'Work Plan Farm Map Landscape' from the left hand side

5. *Optional:* if you want to create a single map for the whole plan, put a tick in 'Show data for all jobs in one map'
6. Click on the *Mapping* subtab
7. From the grid near the bottom of the page, slide the columns along until you can see the column options 'Field Zones All Years' or 'Field Zones Crop Year' as required
8. Double click into the white box that says 'None'; a dropdown list will appear
9. Select the layer you wish to appear from the dropdown list
10. Click *Run Report*

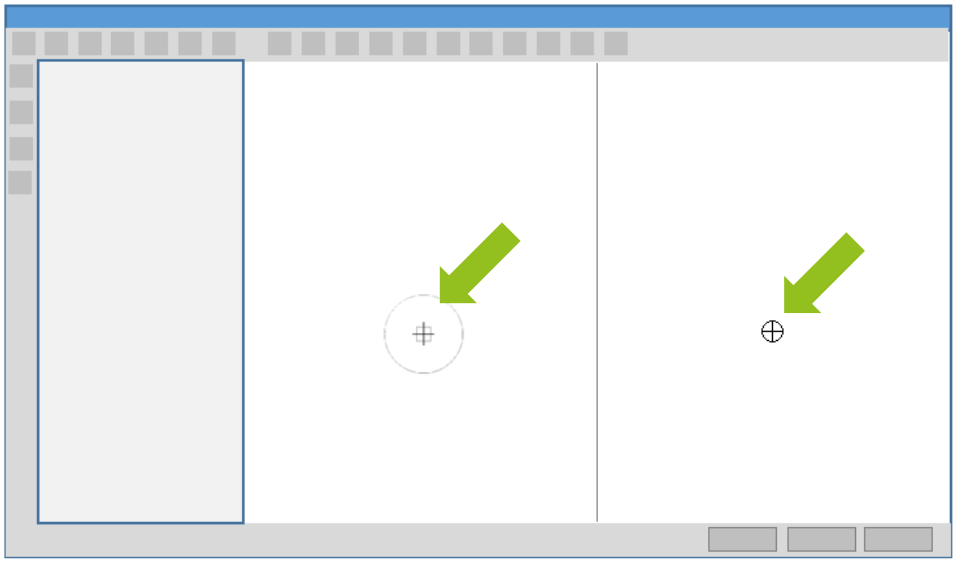
Image layers

- Image layers allow you to import an existing image file and position it on the farm map.
- This can be useful for importing paper drainage map and identifying outfall positions, importing drone images, or screenshots from other information sources.
- Images imported are not clipped to field boundaries, so if you are importing multiple files you may need to use multiple layers to avoid images overlapping (instructions below).
- Compatible image file types are .jpeg, .tiff, .png, .bmp of reasonable size (over 50MB will not import)

To import a background image

From the main Gatekeeper screen:

1. Go to *Setup > Mapping > Import Background Image Map*
2. Select the file path
3. From the left under the heading 'display image on map layer', either
    a. Select an existing layer to import the image onto (the default is 'Image Maps'). You **must** actively select a layer at this point by clicking on a layer name, even if a layer is highlighted in blue. It is successfully selected if the name of the layer is populated in the 'Name' box.
    b. Add a new layer:
        i. Click *Add layer*
        ii. Click on the layer which has been added to the list ('New (0* image)')
        iii. Change the layer name
        iv. Click *Save*
        v. Reselect your new layer from the list
4. Click *OK*
5. A map of the UK will appear. Change the map type if desired using the dropdown list, and then use the scale to box tool to zoom in to the correct location.
6. When you have located the field(s), click *Geo Reference Image.*
7. The next screen that opens will show the location you zoomed to on the left, and the image to be imported on the right. The cursor will be duplicated; keep the cursors in their respective splits of the screen:

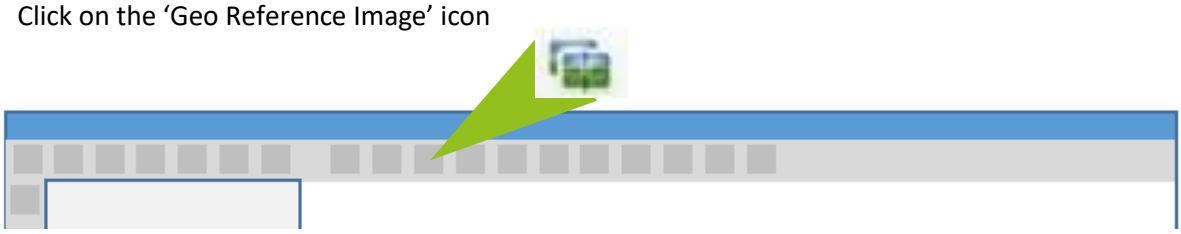


8. Using the right hand cursor in the right split screen, click on a reference point on the image. Corners and distinct features make ideal reference points; ideally you want them to be on opposite corners of the image. After you click, a purple circle will be visible on the image.
9. Using the left hand cursor in the left split screen (which now has a purple circle at the centre of the crosshairs), click on the position of your reference point from step 8 on the map. This will leave a purple circle on the map.
10. Using the right hand cursor in the right split screen, click on the second reference point. A purple link now links the two reference points.
11. Using the left hand cursor on the left split screen, click on the second reference point. As soon as you make this click, the image on the right hand side will be resized and rotated to match the two sets of points.
12. Click *OK* – the screen will close.
13. To view the imported image, open the farm map module and go to the layers menu
14. Expand the 'Image Maps' section and turn on the layer you imported the image onto.

To reposition an image

If you need to adjust the placement of a background image after it's been imported, you can do this from the farm map window:

1. Ensure the image layer is on top and your image is centred in the mapping screen
2. Click on the 'Geo Reference Image' icon



3. The screen will split in two and the cursor will be duplicated; keep the cursors in their respective splits of the screen.
4. Using the right hand cursor in the right split screen, click on a reference point on the image. Corners and distinct features make ideal reference points; ideally you want them to be on opposite corners of the image. After you click, a purple circle will be visible on the image.
5. Using the left hand cursor in the left split screen (which now has a purple circle at the centre of the crosshairs), click on the position of your reference point from step 8 on the map. This will leave a purple circle on the map.
6. Using the right hand cursor in the right split screen, click on the second reference point. A purple link now links the two reference points.
7. Using the left hand cursor on the left split screen, click on the second reference point. As soon as you make this click, the image on the right hand side will be resized and rotated to match the two sets of points.
8. Click *Save* to save changes. Turn off the image layer to un-split the screen and return to the regular mapping window.

Backing up imported background images

Images imported using this method are not automatically backed up by Gatekeeper during synchronisation. Users must therefore take regular backups of the file locations themselves, and particularly before moving to a new computer. For more information please contact the support team.

Geoanalysis layers

- Geoanalysis layers are designed to allow you to display information from the field record visually in the mapping windows.
- The link between the mapping window and field records for the geoanalysis layer is provided by the field boundary – so field boundaries need to be present and correct before geoanalysis can be used.
- Creating a geoanalysis layer consists of three stages: creating a layer, creating a query (or linking to an existing one), and running the query to populate the layer.

Geoanalysis layer ground rules

There are two types of geoanalysis layer: geoanalysis auto, and geoanalysis user defined. The auto layers don't require any set up, and can be switched on just by selecting them, but how they display cannot be edited. Geoanalysis user defined layers are custom, so you can specify how all parameters are displayed.

If you also have the precision actual or John Deere devices modules, you can use the geoanalysis functionality to create whole farm versions of field or job maps – for example, a whole farm yield map.

The link between field records and geoanalysis layers is not 'live' – if you make any changes to field data, you must rebuild any geoanalysis layers for this change to be updated in the maps. Similarly, if you make any changes to the geoanalysis queries, you must rebuild the layer to update the map.

All geoanalysis layers are specific to the cropping year they are in. When you move into another cropping year, the layer will be visible but will have nothing on it until you build it for the first time in that year by rebuilding the layer. While it may feel like more work than expected to create a query, once you have it set up you can use it year after year, so it will save time in the long run!

Viewing a geoanalysis auto layer

From the main farm map window:

1. Select the layers menu from the left hand side
2. Expand *Geoanalysis Auto 2021*
3. Select from the available layer options.

Creating a geoanalysis user defined layer

Geoanalysis layers may be added in the farm map or field map, but are always generated for all fields (you cannot run a geoanalysis query on just one field).

When a geoanalysis layer is created, you can specify a colour to fill the field, and add up to two captions per field. It is therefore possible for a geoanalysis layer to display three sets of information: one colour fill and two captions.

To add a new geoanalysis layer

From either the farm map or field map window:

1. Select the geoanalysis menu from the left hand side
2. Click *Add Layer*

3. Enter a layer name

To create a new geoanalysis query

4. Click *Setup Queries*
5. Click *Add Query* (or, if this is the first query you are creating, click *Yes* to the message that appears).
6. Enter a query name (we strongly suggest this is the same as the name you entered at step 3, so that in future you know which query is for which layer).
7. If caption(s) are required, in the captions section of the page:
    a. Place a tick in the white box to activate the dropdown list
    b. Select the required caption from the list
    c. *Optional:* if caption requires units, the 'Append to caption' box can be used to add text to the end of the caption selected from the list (e.g., 'ha', 'kg/ha', etc). The following shortcuts can be used as required: $ for currency, # for area units, ~ for product units, @ for yield units.
    d. *Optional*: certain categories will also have 'Display as' dropdown lists to choose from. For example, if the caption 'Fixed costs' is selected, the 'Display as' option is visible and users can select from 'Per area', 'Per yield', or 'Total'.
8. At the top of the page, click on the *Searches* tab
9. 'Searches' are the parameter which is being searched, and how a positive result should display on the map. To add a search, work anti-clockwise around the screen as follows:
    a. Click *Add Search*
    b. Select the search parameter (e.g., 'Crop group') and use the single right facing arrow to move it across.
    c. From the right hand side where your parameter is displayed, double click in the 'Data' column and select the parameter to search (e.g., 'Wheat Winter'). (N.B. the 'Comparison' column can also be changed by double clicking if required).
    d. In the 'Search name' box, either
        i. Replace 'New' with the name of the search parameter, or
        ii. Click *Search Name = Data* to automatically use the 'data' field as search name

    (The search name is what will appear next to the key once the map is created).
    e. Select a colour using the '…' icon
    f. *Optional:* If you want the fill to be hatched rather than solid, select *Hatch* and then a hatch style from the dropdown list.
    g. Click *Save* and repeat for all styles as required. Once the first search is setup, you can use the *Copy Search* button to duplicate and then adjust the parameters as required.
    h. *Optional:* Once all searches are created, the *A-Z* button will sort the searches into alphabetical order.
10. Click *OK*

Linking the query to the layer and creating the map

11. Select the query you have just created from the dropdown list
12. Click *Rebuild Layer*
13. In the window that pops up, click *OK*.

Sharing geoanalysis queries

Geoanalysis layers cannot be shared between Gatekeeper sites, but the queries may be published and layers rebuilt on each site as required. Each site will display a geoanalysis layer based on the field records within that specific site, so using the same query does not guarantee exactly the same map will be created.

To publish a geoanalysis query, from the main mapping window:

1. Ensure a geoanalysis layer is switched on
2. Go to the Geoanalysis menu
3. Click *Setup Queries*
4. Click *Publish Query*
5. Select publication recipient and add message if necessary
6. Click *OK*. Publication will be sent next time you synchronise or do a send/receive.

Appendix 1 – The mapping menus

Active tools menu

Click to view Active Tools *menu*

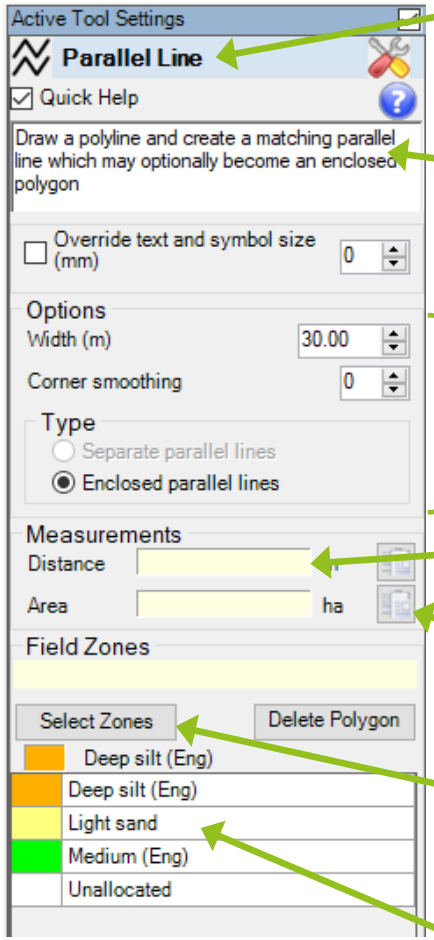
Tool information – a description of the currently selected tool will be displayed here. To hide this information, take the tick out of Quick Help.

The main portion of the screen will display options relating to the currently selected tool. If a cartographic layer is on top, available styles will be displayed alongside tool options. If a zones layer is on top, available zone allocations will be displayed.

To manually override the size of text and symbols, put a tick in this box and increase the number displayed.

Headup display options – see p.9 *for information on functionality*

View with a layer and tool selected:



Selected tool name

Selected tool description

Selected tool options (varies depending on tool)

Selected tool measurements (will display as tool is used)

Copy to clipboard (to copy measurement)

Shortcut to select zones screen (if a cartographic layer is selected, this will be Setup *for styles menu*

Available zones (if a cartographic layer is selected, this will be available styles)

Layers menu

Click to view Layers *menu*

Select Bing backdrop from dropdown list

Tick to switch Bing backdrop on or off

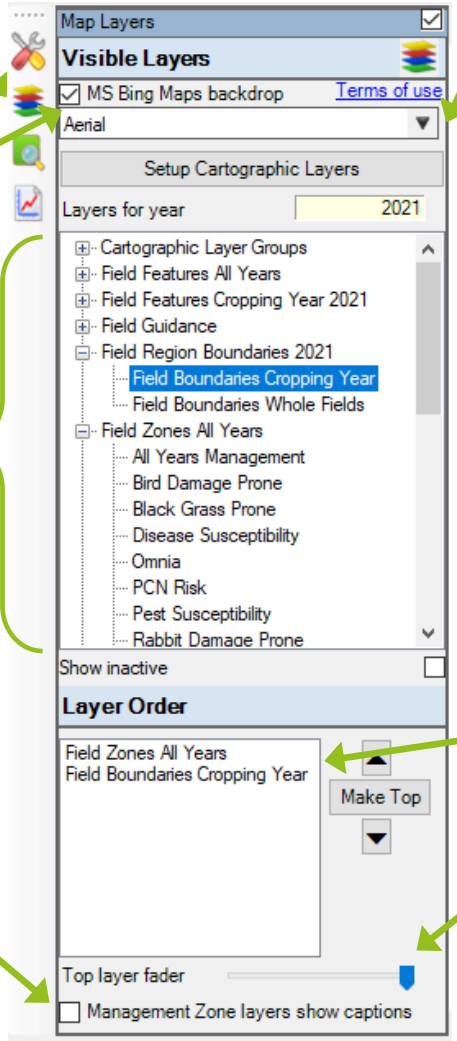
Expand layer groups by clicking on the plus icon.

Selected (visible) layers are highlighted in blue.

Layer order is shown here and can be changed using the arrows or the 'Make Top' button

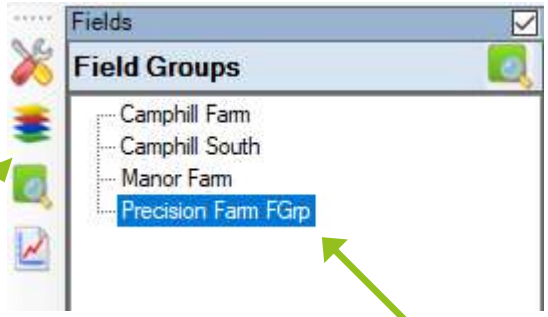
Zones in field layer groups will show captions if this box is ticked

Top layer fader adjusts the transparency of the top layer – see page 7.



Field group menu (farm map)

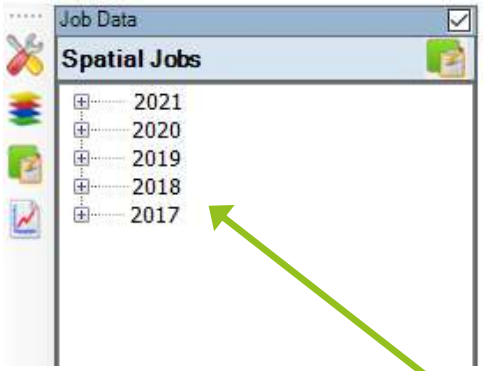
Click to view Field Groups *menu*



Selected field groups will be visible. Multiple groups may be selected

Job data menu (field map)

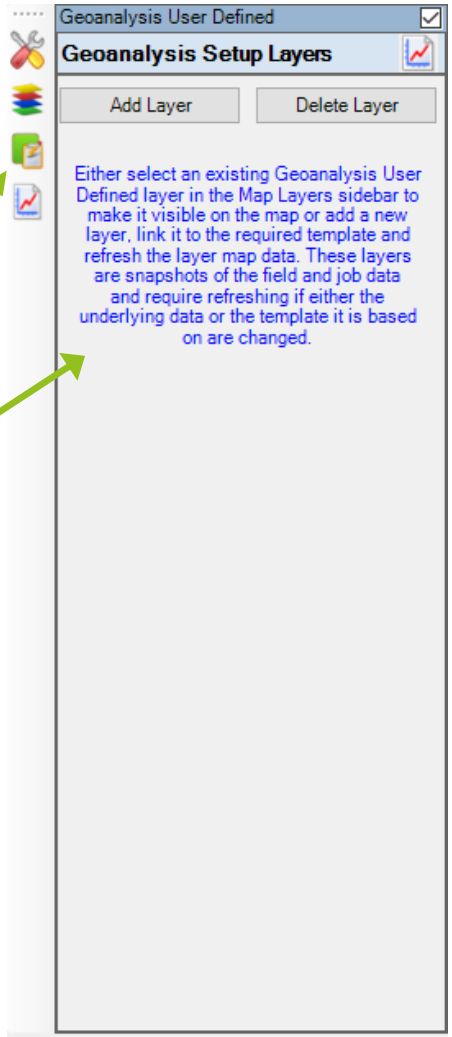
Click to view Job Data *menu*



If any spatial jobs are present in the field's history, they may be selected to view here.

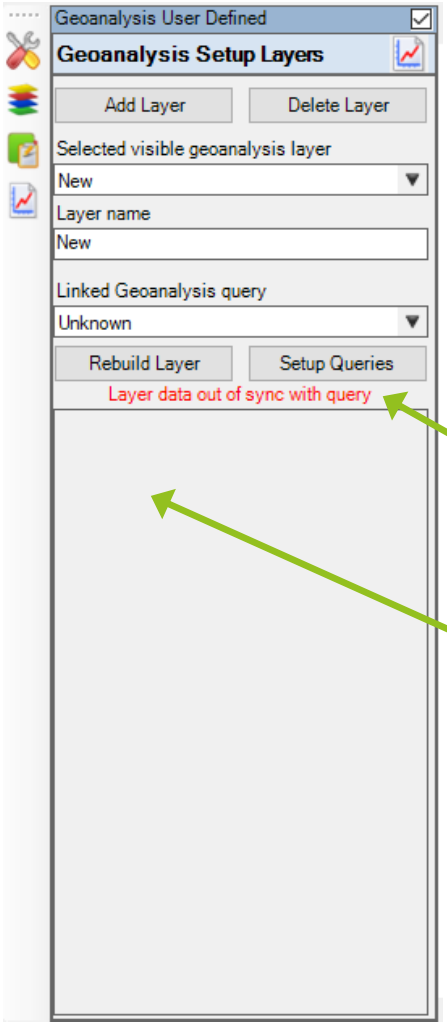
Geoanalysis menu

Click to view Geoanalysis *menu*



Where this message is visible, either no geoanalysis layers have been created yet, or none have been selected from the Layers *menu*.

After an existing layer is selected, or Add Layer *is clicked, layer options will become visible*



Where this red message is visible, the layer selected should be rebuilt to ensure changes in field data or geoanalysis query are reflected in the map.

After a geoanalysis layer has been created, the map key will be visible here.

Appendix 2 – universal mapping tools

Icon	Tool	Function	Use and tips
	Show second library map	Splits the mapping screen in two	See page 8. Take care to keep cursors on the correct side of the screen.
	Save data	Save	Use regularly. Same function as the 'Save' button in bottom right.
	Reports	Run reports	Useful to automatically split maps into field groups for printing or saving – see page 12.
	Print map	Print map	Useful to print or save the map exactly as it appears – see page 12.
	Copy to clipboard	Copy screen	Copies the visible map window so that it can be pasted into another place.
	Publish map layers	Publish layer to another Gatekeeper user	May be layer including contents, or just layer styles
	Cancel back to last saved data	Takes you back to the last save	Take care – this is not an 'undo' button!
	Scale in	Zoom in	Zooms the map in, focusing on the centre of the screen
	Scale out	Zoom out	Zooms the map out, from the centre of the screen
	Clear measurements	Deletes any measuring lines	Measuring lines are only ever temporary: they will disappear if you close the mapping window.
	Scale to box	Zooms map to box drawn	This tool is not click and drag – click to mark the first corner of the box you wish to zoom to, pull the mouse to draw a zoom box, and then make a second click.
	Field view	Shows field records	From farm map you will need to click twice – once to open the field map, then once to open the field records.
	Measuring polyline	Measure length	To trace an existing line, make sure the snap on and line grabber functions are turned on. You can specify a maximum length of the measuring line under 'Options' in the active tools menu.
	Measuring polygon	Measure area	Freehand draw the area to be measured, or copy an existing polygon by right-clicking inside it and selecting *Find complex polygon*. Right click again and select *Finish this entity*. Measured area will be displayed around the cursor if

			'Display Data' is turned on, and on the active tools menu
	Measuring circle	Measure area of a circle	Enter the radius required on the active tools menu; left click on the map to draw the circle. Area and radius are displayed on the active tools menu.
	Measuring headland	Measure area within a headland or the rest of the field	After you have selected the tool, specify the width, whether you wish to measure inside or outside the selected polygon, and whether you wish to mark the headland or field remainder. Place cursor inside field; right click and select 'Find Complex Polygon'; right click again and select 'Finish this Entity'.
	Measuring parallel line	Measure length of two parallel lines, or area between them	Enter the width that you want the lines to be separated by in tools menu. For two single lines, select the mode 'Separate parallel lines', for a joined shape use enclosed. Trace the underlying line clockwise if you want to second line to measure into the field; anticlockwise to measure out of the field (second line appears on right hand side of first line in direction of travel).
	Measuring grid lines	Measure grids or multiple lines across a polygon	If using sampling mode: set axis spacing to size of grids required (1ha grids = 100x100m). Offset options control how the grids are placed within the polygon. To measure tramlines across a field, use polylines mode. Remember measuring lines are not saved between mapping sessions so if you will want to refer to grid lines again, use the 'Grid lines' tool on a layer.
	Drag visible map	Click and drag the map	Click once to pick up the map, pull it to move, click again to drop.
	Pointer	Return to pointer tool (from any other selected tool)	

Appendix 3 – cartographic layer tools

Icon	Tool	Function	Use and tips
	Polygon	*Draw a shape*	Left click to place points, right click to access menu and finish.
	Insert sub polygon	*Draw a secondary shape associated with an existing polygon*	First click must be inside the shape you wish to associate a sub polygon to. Also accessible from the right click menu after using the polygon tool.
	Insert island polygon	*Draw an exclusion from an existing polygon (cut out an area)*	First click must be inside the shape you wish to mark an exclusion from. Also accessible from the right click menu after using the polygon tool.
	Split polygon	*Split an existing polygon into two separate entities*	First click must be inside the shape you wish to split. Draw a line which starts and ends outside the shape, and then right click and select *Split polygon along the line*. Use the 'Move entity' tool to move the splits.
	Polygon shift	*Increase or decrease a shape by a set width*	Enter the width you wish to change shape width by. Select 'Inside' to make the shape smaller, or 'Outside' for larger. First click must be inside the shape, and a second click applies the increase/decrease.
	Headland	*Draw a headland or field remainder of a specific width, inside or outside a polygon.*	After you have selected the tool, specify the width, whether you wish to measure inside or outside the selected polygon, and whether you wish to mark the headland or field remainder. Place cursor inside field; right click and select 'Find Complex Polygon'; right click again and select 'Finish this Entity'.
	Polyline	*Draw line*	Left click to place points, right click to access menu and finish. There is an option to draw a sub-polyline (same functionality as sub-polygon).
	Bearing	*Draw a line which is labelled with its bearing*	Bearing will appear next to the first click; arrow head will appear at the point of the second click.
	Parallel line	*Draw a pair of lines a set distance apart, which may be enclosed*	Enter the width that you want the lines to be separated by in tools menu. For two single lines, select the mode 'Separate parallel lines', for a joined shape use enclosed. Trace the underlying line clockwise if you want to second line to

			measure into the field; anticlockwise to measure out of the field (second line appears on right hand side of first line in direction of travel).
	Arrow line	*Draw a line with an arrow head*	The arrow head will be placed where the first click is located. Double headed arrows are available; right click after first left click and select 'Add last point and finish double ended arrow'.
	Rectangle	*Draw a rectangle*	Left click to start drawing, and right click to access menu and finish.
	Circle	*Draw a circle*	Optional: specify a radius before clicking. Left click to mark the centre of the circle. If required, adjust side using the 'Move Point' tool and clicking on the snap point on the circle line.
	Symbol	*Insert single or joined symbols with the option of adding text labels*	Left click to drop symbol. Select symbol type from dropdown list, and if required select from mode options.
	Grid lines	*Divide an entity into grids, or set replicating lines across a polygon*	If using sampling mode: set axis spacing to size of grids required (1ha grids = 100x100m). Offset options control how the grids are placed within the polygon. To measure tramlines across a field, use polylines mode.
	Text	*Add a text label; can be used to display map co-ordinates*	Left click to place text label. (NB text labels can be added as symbol tool is used, so it may be more appropriate to use this option)
	Change entity's style	*To change the style of an entity*	Select tool, then select style you wish to change entity to. Click on a snap point of the shape you wish to change.
	Insert points	*Insert points into an existing line*	Right click over an existing snap point, and select either *Insert point BEFORE* or *Insert point AFTER*. Before and after refer to the order the points were originally drawn – if this is not known, you can check the point references by turning on the *Headup Display > Display data* option and hovering over points.
	Move point	*Move a point*	Left click to pick up a point, move it, and then left click again to drop it in the new position.
	Move entity	*Move an entire entity*	Left click on a snap point to pick up an entity.

	Delete point	*Delete a point*	Left click on a snap point to select it, second left click to delete it.
	Delete entity	*Delete an entire entity*	Left click on a snap point to select the entity, second left click to delete it.
	Rotate entity	*Rotate an entity*	Left click on a snap point: the entity will rotate around the point you clicked on. Left click again to drop the entity in the new position.
	Clip points	*Delete points within or without a drawn polygon*	Left clicks to draw a shape. Right click and select *Clip points inside polygon* to delete all points within the polygon, or *Clip points outside polygon* to delete all points outside the polygon (use with care!).

Cartographic layers available to import with predefined styles from Farmplan:

- ELS Layer
- HLS Layer
- Drainage Layer
- Footpaths Layer
- Low Lying Obstacles Layer
- Overhead Obstacles Layer
- Manure Management Layer
- NVZ Risk Zones Layer
- NVZ Muck Heap Layer

Appendix 4 – field zone layer tools

Icon	Tool	Function	Use and tips
	Polygon	*Draw a shape*	Left click to place points, right click to access menu and finish
	Polygon shift	*Increase or decrease a shape by a set width*	Enter the width you wish to change shape width by. Select 'Inside' to make the shape smaller, or 'Outside' for larger. First click must be inside the shape, and a second click applies the increase/decrease.
	Headland	*Draw a headland or field remainder of a specific width, inside or outside a polygon.*	After you have selected the tool, specify the width, whether you wish to measure inside or outside the selected polygon, and whether you wish to mark the headland or field remainder.
	Parallel line	*Draw a pair of lines a set distance apart, which may be enclosed*	Enter the width that you want the lines to be separated by. For two single lines, select the mode 'Separate parallel lines', for a joined shape use enclosed.
	Grid lines	*Divide an entity into grids, or set replicating lines across a polygon*	If using sampling mode: set axis spacing to size of grids required (1ha grids = 100x100m). Offset options control how the grids are placed within the polygon. To measure tramlines across a field, use polylines mode.
	Waypoints	*Draw a line of waypoints*	Left click to drop each waypoint as required, right click to finish.
	Change polygon's zone	*To change the zone allocation of an entity*	Select tool, then select zone name you wish to change entity to. Click anywhere inside the zone you wish to change.
	Change polygon's Z order	*To move an entity up or down in priorities (similar to the 'bring to front' or back principle in Microsoft softwares)*	Select tool, and right click inside the zone you want to move. Right click and select from options to move zone up and down.
	Insert points	*Insert points into an existing line*	Right click over an existing snap point, and select either *Insert point BEFORE* or *Insert point AFTER*. Before and after refer to the order the points were originally drawn – if this is not known, you can check the point references by turning on the *Headup Display > Display data* option and hovering over points.
	Move point	*Move a point*	Left click to pick up a point, move it, and then left click again to drop it in the new position.

	Move entity	*Move an entire entity*	Left click on a snap point to pick up an entity.
	Delete point	*Delete a point*	Left click on a snap point to select it, second left click to delete it.
	Delete entity	*Delete an entire entity*	Left click on a snap point to select the entity, second left click to delete it.
	Clip points	*Delete points within or without a drawn polygon*	Left clicks to draw a shape. Right click and select *Clip points inside polygon* to delete all points within the polygon, or *Clip points outside polygon* to delete all points outside the polygon (use with care!).

Appendix 5 – geoanalysis query parameters

Caption options		
All costs $	Last soil sample index	Output $
Crop	Last soil sample PPM	Previous crop *
Descriptor	Margin heading quantity $ *	Sheet reference
Field group	Margin heading type quantity $ *	Soil type
Field name	Margin heading type value $ *	SPR soil risk
Field reference	Margin heading value $ *	Sulphur deficient
Fixed costs $	Net margin $	Variable costs $
Gross margin $	NG number	Variety
K releasing clay	NVZ	Working area
Last soil sample comment	Official area	
Last soil sample date	OS area	

Captions with $ may be specified to display as per area unit, per yield unit, or total, as required.
Captions with * must have a sub-type selected before the query can be created.

Field search parameters		
Active cropping record/plot	Job agronomist volume rate/ha	Job tank mix volume rate/ha
Active field	Job carried out end date	Job tractor unit name
Buffer zone comment	Job carried out operator name	K releasing clay
Business name	Job carried out start date	Map sheet
Crop group	Job comment	Next year's crop
Crop name	Job field comment	NG number
Descriptor	Job field completed comment	Part field reference
Earliest predicted harvest	Job field status	Plan comment
Field crop reference	Job implement name	Plan conditions
Field group name	Job note comment	Plan reference
Field has plots	Job note date	Previous year's crop
Field ID number	Job note heading group	Protocol name
Field in NVZ	Job note value	Soil sulphur deficient
Field name	Job sampling nutrient group	Soil type
Field note comment	Job sampling reference	SPR soil risk
Field note date	Job seed dressing active ingredient	Tag/planting period
Field note heading group	Job seed dressing active ingredient group	Target yield/ha
Field reference	Job seed dressing product	Variety name
Field split number	Job sequence number	Watercourse width
Holding name	Job source module	