Rogaine Map preparation in OOM: The Cartographer's Guide

As the title implies, this is a guide to preparing rogaine maps using a program called Open Orienteering Mapper. If you are familiar with OCAD or drawing programs generally, then you will already be familiar with a lot of the methods described in this guide. The table of contents on the next page is a good place to start when looking for specific information.

The contents of this guide have been laid out in roughly the order that the each task will probably need to be done. Below is an overview of these tasks. You should check off each task as you complete it.

1. Ensure that your map data is properly georeferenced

2. Load the current WARA standard symbol set

3. Draw magnetic north lines

The first three steps are not covered by this guide as they will probably be completed by the map banker before the map file is given to you.

4. Delete any old control circles and control numbers

5. 'Armchair' your control locations, by placing control circles on the map.

6. Print a draft of your map for fieldwork.

7. Conduct fieldwork and set controls. When setting controls record GPS waypoints for each setting plate and record tracks of your movements in the field.

8. Import the GPS data and make sure the waypoints fall inside the control circles. Make sure the GPS tracks make sense. Since a lot of fieldwork is done by vehicle on roads, a GPS track will often show where roads are incorrectly mapped, or make it easy to draw in roads that aren't mapped at all. Adjust the position of control cirlces and other features as required.

9. Repeat steps 6–8 until all setters and vetters are satisfied that the control circles and other features are satisfactorily mapped.

10. Once fieldwork and mapping is complete, crop the map. Keep a copy of the uncropped map.

11. Add Title and all other required text, a legend, scale bar and logos

12. Add any custom artwork

13. Save the map to PDF format and arrange to have the map professionally printed. Obtain a printed proof and check the colours before giving the go ahead to print hundreds of copies.

Contents

Downloading and installing OOMapper

OpenOrienteering Mapper, or OOMapper or simply OOM, is a free program that can be used to make rogaining maps. OOMapper is compatible with Windows, Mac and Linux. To download and instal your free copy:

- Visit http://openorienteering.github.io/ and click **Mapper** from the main menu bar.
- You will be taken to a page listing the various versions. You want the most recent version, which is listed first (in October 2015 the most recent version was 0.5.96). If you have a 64-bit version of windows, I highly recommend downloading the file marked **x64-Installer**. If you are not sure what version you have, or you are still running XP, then choose the file marked **x86-Installer**.
- Once the file is downloaded, open it to start installation.
- When complete, click **Finish**.

> *Note:* You might be interested to know that there is also an experimental version of OOM for android based phones and tablets available from the same website above. However, I recommend using the desktop version for rogaine map preparation.

Starting OOM and opening an existing map

- Locate OOMapper in your program menu and open it.
- Upon entry the welcome screen will be displayed. On the left, under **Activities**, you will be given the option of creating a new map or opening an existing one. The **Recent Maps** panel lists the maps you have recently worked on (and is probably blank the first time!)
- Click **Open map …**
- Navigate to the map you want to open. OOMapper will accept map files that were made in OCAD, which are saved in *.ocd* format, as well as files made in OOMapper, which are saved in *.omap* format.
- Click **Open**
- Opening a file made in OCAD almost always generates a warning. The things it warns you about *usually* aren't worth worrying about. If you see a warning, have a quick read, then click **OK**.

OOM screen layout

The workspace of OOM is split into four main parts. These are:

- Toolbars — usually positioned along the top of the screen
- Windows — usually positioned down the right hand side of the screen
- Status Bar — always positioned along the bottom of the screen
- Map Editor — this is the area in the middle where your map appears
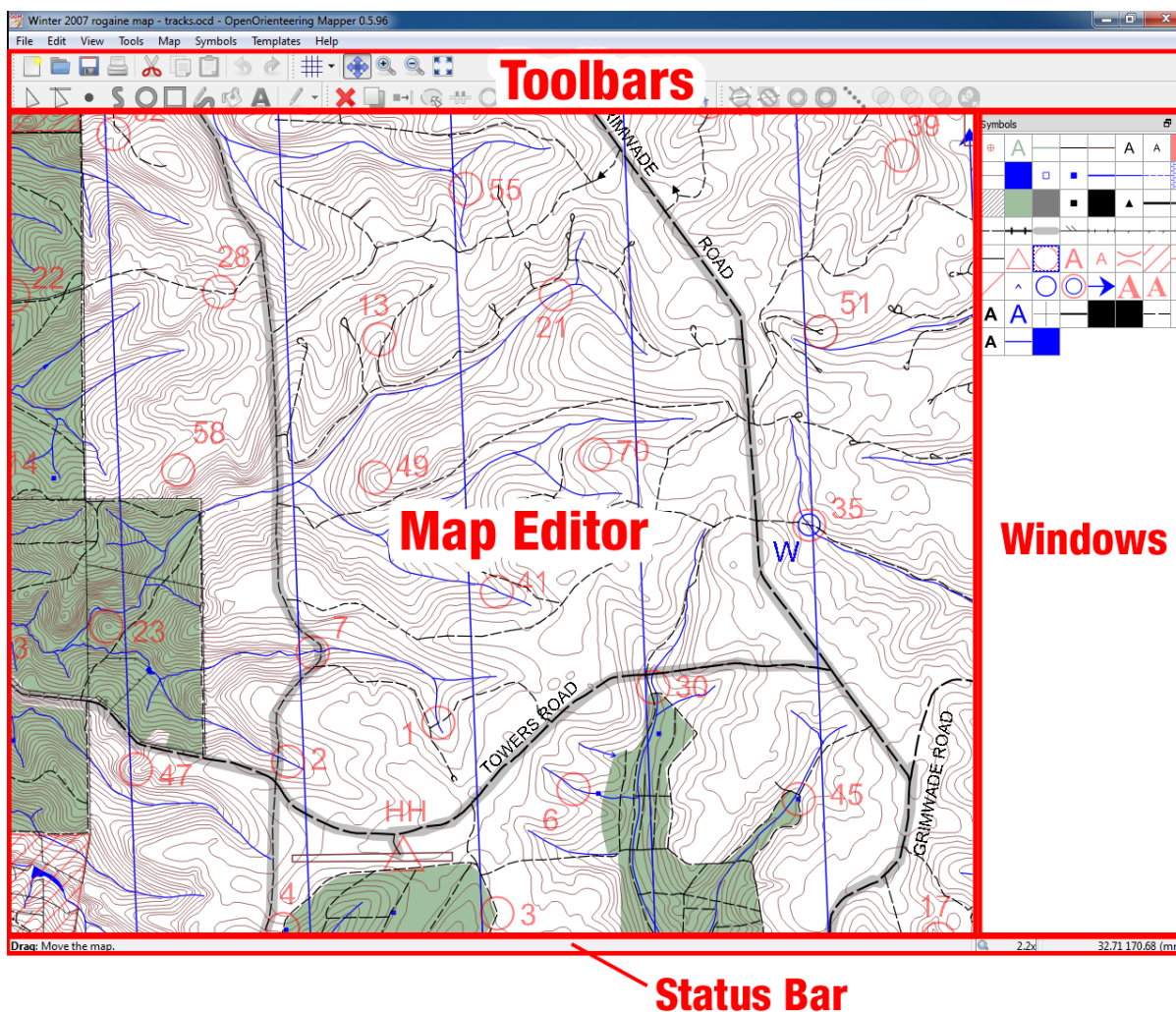

Rearranging toolbars

The toolbars and windows can be rearranged on screen to suit your preference. At the left end of each toolbar is a series of vertical dots. When you move the mouse cursor over these dots a 4-way arrow ⊕ will appear. To move a toolbar, click and drag these dots. As you drag the toolbar around, the other toolbars and windows might move out of the way to create a spot for your toolbar to move to. When you release the mouse button, the toolbar will fall into its new home.

Rearranging windows

Similar to way toolbars are moved, windows can also be moved. To do this:

- *Left-click and drag* the title bar near the top of the window.

Windows can also be resized. This includes changing the width of the symbol window. To do this:

- *Hover* the mouse between the Map Editor and the window you want to resize until this cursor appears.
- *Left-click and drag* until the window is the width that you want, then release the mouse button.

Showing and hiding windows

OOM has several toolbars and windows. When you start the program for the first time, all of the toolbars are visible, but only one of the windows (the symbols window) is visible. To see the full list of windows that are available, go to **File >> View** and at the bottom you will see the names of the four windows, which are:

- Tag Editor
- Color Window
- Symbol Window
- Template Setup Window

Alongside, each entry is an icon depicting a window. If this icon has a faint blue box around it, like this one , then the window is visible. I recommend making the template setup window and tag editor visible as you are likely to need these during rogaine map preparation.

Zooming and moving the map

Zooming in and out

There are three ways to zoom in and out. These are:

1) left-clicking one of the magnifying glasses on the View toolbar,
2) pressing "**+**" or "**-**" on your keyboard, or
3) rolling the mouse wheel — when *rolling* your mouse wheel forward, the screen will zoom toward the point under your cursor ad when *rolling* the mouse wheel backward, the screen will zoom out by holding stationary the point under your cursor.

Zoom to map

By clicking ▦ in the view toolbar, the program will set the zoom so that the map fills the screen.

Panning

To move the map around on the screen without zooming (known as panning), click the

pan icon ✥ in the view toolbar, then *left-click and drag* the map.

The right-click tool widget

If you *right-click* on the map window an octagonal toolbar showing eight icons that represent some commonly used tools will be displayed. Some of the options will be greyed out, indicating they are not available for your current task. To change tool, simply *left-click* the tool you want to use. All of these tools (which we will discuss later) can also be found in the various toolbars along the top of the screen. This menu is merely a quicker way to access these tools.

Working with symbols

The symbols window shows all of the symbols that are currently defined in your map. If you cannot see the symbols window, make sure it is turned on (see the Showing and hiding windows section above). There are four symbol types to be aware of. These are:

- **Point symbols** – used to draw simple (and sometimes complex) objects positioned near a single point, like control circles, the hash triangle and rogaining and sponsor logos,
- **Line symbols** – used to draw lines, like roads, watercourses and contours,
- **Area symbols** – used to draw filled shapes, like out-of-bounds areas and plantation areas, and
- **Text symbols** – used to write text on your map

Adding new point objects to the map

To draw a point symbol on the map, first

- Select the symbol you want by left-clicking the icon in the symbols window.
- Make sure the 'Set point objects' tool depicted by a dot (see right) is selected in the drawing toolbar.

- Move your mouse cursor over the map. You will see a greyed-out version of the symbol appear behind your mouse cursor.
- To place one point symbol, left-click at the desired location on the map.
- Also, to rotate the point symbol while placing it (not all point symbols can do this!!), *left-click and drag*. As the cursor moves the symbol will rotate. Release the mouse button when the rotation is correct. This is particularly useful when drawing continuation arrows.

Adding new line and area objects to the map

To draw a line or area object on the map, first select the symbol you want *by left-clicking* the corresponding icon in the symbols window, and then choose which of four drawing tools you want to use (see image on the right).
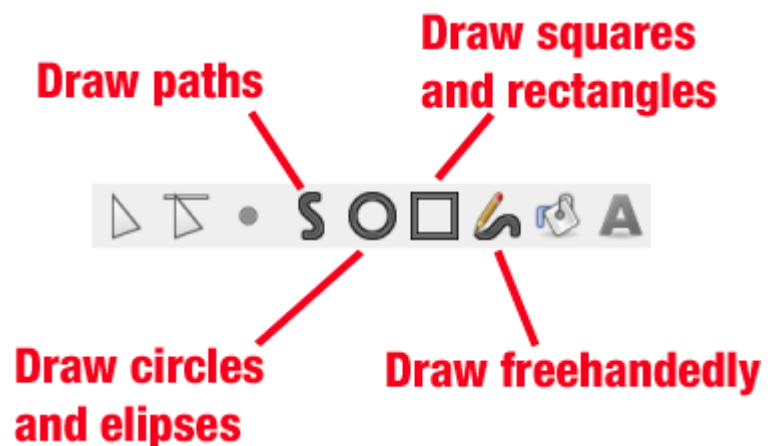
OOM drawing tools are quite powerful. By holding down the **Shift** key or **Ctrl** key, the normal function of the mouse left-click can be changed. Also, a short left-click will often generate a different result compared to a left-click and drag. To get a list of the various key combinations and a short description of what they do without having to refer to this guide every five minutes, look at the status bar displayed along the bottom of the program window — the status bar is an excellent source of information and will usually give enough clues to help you get through.

But if you prefer all your instructions on paper please see the last page of this guide for a complete list of ways that the these tools can be used.

Adding new text to the map

In the symbols window select the symbol for the text type that you want to use. This will cause the

Write Text tool in the toolbar to become active (if not, *left-click* on it to activate).Two different types of text objects can be placed with this tool:

- **Left-clicking once** will create a text object anchored to a single point (this point is marked by a small blue square, but is only visible when text is selected with the *Edit Objects* tool).
- **Left-clicking and dragging** the mouse will create a text box (with automatic text wrap, meaning the text will be forced onto the next line after it reaches the width of your box).

> **Usage note:** Single point style text objects should be used for control numbers, road names, map titles and other short names. Text boxes should be only used for long sentences over two or more lines and therefore rarely used — one situation when you might use a text box would be when thanking landowners and listing many names.

After placing an anchor point or text box a vertical blue line will appear. This is the text cursor and shows where the text will begin when you start typing. The alignment window will have also appeared (see right), which controls how the text should be aligned. The top row shows horizontal alignment (the options being left, centred and right-aligned), while the bottom line shows the vertical alignment (the options being top, centred, baseline and bottom-aligned). By changing these settings, you will change the position of the text relative to the anchor point or text box. Once you have finished typing, commit your changes by pressing the **Esc** key.
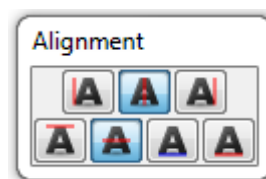
Working with object selections

Up until now this guide has been discussing methods for adding new objects to a rogaine map. Now we address methods to change or delete existing objects. The first step is always the same: you must create a selection containing one object (or multiple objects) that you want to work with. The tool that is used to make selections is the *Edit Objects* tool , available from the toolbar. Once activated, the mouse cursor will take on the same triangle shape.

To select one object:

- *Left-click* it OR *left-click and drag* a rectangle around it

Once selected, the object becomes slightly darker in colour and a pink dotted line surrounds it. If we now *left-click* on a second object, the first object will be deselected and the second object will

instead become selected. To remove all objects from a selection, left-click in white space or press the **Esc** key.

We can also include additional objects in (and remove objects from) any existing selection by holding the **Shift** key. So, to select both the first and second objects we could:

- Select the first object (detailed above),
- Hold down the **Shift** key then *left-click* or *left-click and drag* a rectangle around the second object. You will notice that both objects are now darker in colour and the purple dotted line has expanded to encompass both objects.
- If you want to add many items to an existing selection, one of the fastest ways is to hold **Shift** and *left-click and drag* a rectangle around multiple objects.

Lastly, objects can be removed from a selection in the same way:

- Hold down the **Shift** key then *left-click* or *left-click and drag* a rectangle around the object(s) you want to remove.

Moving objects around (all object types, one or more objects at a time)

- Select the object(s) you want to move.
- You will notice a purple dotted rectangle surrounding your selected object(s). Move your mouse cursor over this dotted line.
- When it turns orange, *left-click and drag* the rectangle.
- Release the mouse button to place the object(s) in the new location

Moving objects around (point or point text objects only, ONE object at a time)

The method in the last section works for all objects. However, point objects (like the hash triangle) or a single point text object (like a control number) can also be moved around by left-click and dragging their blue anchor:

- Select one point or point text object you want to move. A blue anchor point will appear.
- *Left-click and drag* the anchor box to the desired location.
- Release the mouse button.

Tip: Holding the **Shift** key when moving a single point or point text object will cause it to snap to a line or another point object. This is very useful for positioning a control circle directly on top of a building or over a watercourse/fenceline/road etc. This also works for text point objects, line objects and area objects, but is less useful.

Rotating objects

- Select the object(s) you want to rotate.

- Activate the rotate tool   or press the '**R**' key on your keyboard.

- A small black circle will appear at the centre of your selection. This is called the centre of rotation and it is the point that will be held fixed about which your selected objects will be rotated. If you want to reposition the centre of rotation, *left-click* the point you would like to move it to.

> **Tip**: Holding the **Shift** key while dragging will force the objects to rotate in 15° increments.

- *Left-click and drag* to rotate the objects

Duplicating objects

- Select the object(s) you want to make a copy of.

- Activate the duplicate tool   or press the '**D**' key on your keyboard. You won't see anything change as the new object will put placed exactly on top of the original. To separate the duplicate from the original, select one of them by left clicking the object once, then left-click and drag the duplicate to the desired location.

Deleting objects

- Select the object(s) you want to delete.

- *Left-click*   in the toolbar or press the **Del** key on your keyboard.

Editing existing text

- Select <u>ONE</u> item of text you want change.
- When the purple dotted bounding box becomes visible, move the mouse over the text until you see this cursor: I
  Important tip: If this cursor does not appear, zoom in and try again.
- *Left-click* to place the text editing cursor on the text, which appears as a vertical blue line (this cursor doesn't flash). Alternatively *left-click and drag* to select multiple characters.
- Change your text.
- To finish editing, press the **Esc** key or *left-click* away from the text in white space.

Editing line and area objects

Both line objects and area objects consist of multiple points connected by line segments. Points are shown as small blue squares (or diamonds) and are used to mark each vertex in a line or area object. You can alter the shape of a line or area object by manipulating these points and segments.

> OOM is capable of drawing both straight-line and curved line segments. However, all of the data we purchase from Landgate uses only straight-line segments. All objects that are curved in reality, like contours, are drawn as a series of short straight lines, which when zoomed out look like a curve. Since curves are not generally used on WARA rogaine maps, this guide will only explain how to work with straight-line segments.

To begin editing:

- Select the line or area object that you want change. All of the points (blue squares or diamonds) used to define the object will become visible.

There are four basic ways to alter objects. These are:

1) Move a point in the object to a new location:
   - *Left-click and drag* the point to its new position then *release* the mouse button. Repeat for other points as desired.
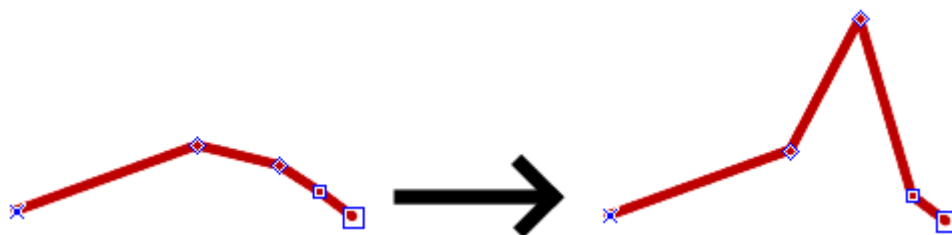
2) Insert a new point:
   - *Hold* the **Ctrl** key then *left-click* on the line or area edge away from the other points. A new point will appear. Repeat this step as desired.
   - *Release* the **Ctrl** key.

3) Delete a point:
   - *Hold* the **Ctrl** key then *left-click* on the point you want to delete. The point will disappear and the shape of the object will change. Repeat this step as desired.
   - *Release* the **Ctrl** key.

4) Move one line segment to a new location,

- Activate the *Edit lines* tool ⬜ in the toolbar.
- *Left-click and drag* the line segment you want to move to its new position then *release* the mouse button. Repeat this step with other segments as desired.
- In the example below the third segment from the left (the bit of the line between the third and fourth points from the left) has been moved.

Dash points

In the images in the preceeding section you can count four different blue anchor points that define the position of each vertex in the line. They are:

- the "cross", which marks the start of a line,
- the large square, which marks the end of a line,
- the diamond, known as a "dash point", and
- the small square, known as a "normal point"

The first, second and fourth in the list behave in the same way. However, the dash point is able to alter the appearance of dashed lines. In the following example there are two minor roads that form a crossroads. Even though there is a normal point drawn on each line at the centre of the intersection, because of the dashed nature of the roads, the actual crossing is blank. If we want to force OOM to centre one of the dashes exactly over the centre of the intersection, we can convert the normal points to dash points. To do this:

- Select one of the lines.
- Hold **Ctrl** and the **Spacebar** then *left-click* the normal at the centre of the intersection.
- Select the other line and repeat the second step.

The image below illustrates crossroads with normal points (left) and with dash points (right).
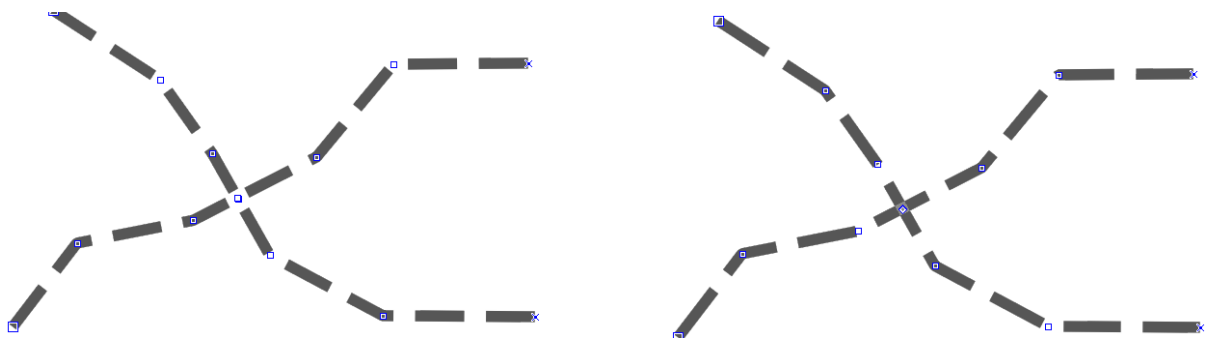
Importing GPS waypoints and track

When setters are conducting fieldwork, it is highly recommended that they carry a GPS. The GPS devices owned by WARA, as well as many other devices including GPS-enabled mobile phones, are capable of recording "tracks" (also known as "routes" or "traces") and "waypoints". It is recommended that setters record a continuous track from the moment they start to the moment they end fieldwork each day, even when driving. Also, when placing a setting plate, a waypoint should be taken to record both the position and ID of the plate.

Once these tracks and waypoints have been recorded they can be imported into OOM. The waypoints are the most important, since they will show whether or not the setting plate was placed at the position indicated by the control circle. The tracks are sometimes useful to identify features, especially roads, that have been incorrectly mapped or not mapped at all. In these cases the cartographer would use the GPS track to redraw the road in the correct place on the map.

To import GPS information into OOM you need to obtain the data from your device in GPX format. This guide will not attempt to describe how to retrieve tracks and waypoints and save them as GPX files since every GPS device and the software used to access them is different. Please contact a WARA committee member (or tech guru if you have one) if you need help retrieving GPS data.

The steps below will only work with a properly georeferenced map. If GPS data does not appear in the right place seek help from a committee member. To import your waypoints file into OOM:

- Select **File >> Import…**
- Navigate to your GPX file containing your waypoints, then click **Open**
- A dialogue will appear. Select **Georeferenced**
- You may be asked, *"Should the waypoints be imported as a line going through all points?"* Click **No**. All of the imported points will appear as very small grey dots. They will all be automatically selected.
- Before clicking anything else, *right-click* the GPS waypoint symbol in the symbols window.
- In the menu that appears, select **Switch symbol of selected object(s)**
- If you now zoom in each waypoint should now appear as a small circle with a green crosshair, hopefully inside the control circle:
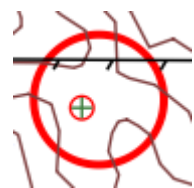
Unlike OCAD, the two letter setting plate code that you typed in when recording the waypoint is not visible on the map. If you want to see the two letter code of any particular waypoint that you keyed in to the GPS do the following:

- Select **View >> Tag Editor**. The tag editor window will open
- Select one waypoint
- If you used the WARA GPS devices then you will see something like the image to the right, where *LG* is the two letter code on the setting plate that was keyed in when the waypoint was recorded.

To import your waypoints file into OOM:

- Select **File >> Import…**
- Navigate to your GPX file containing your waypoints, then click **Open**
- A dialogue will appear. Select **Georeferenced**. The GPS track(s) will appear as this grey line(s).
- Right-click on a line symbol in the symbols window that you want to use to colour your track e.g. the green and yellow winner's route.
- In the menu that appears, select **Switch symbol of selected object(s)**

Cropping your map

Often the map data you are provided with will cover a larger area than what is eventually printed on your competition map. In these cases will probably need to 'crop' the map, which refers to deleting the unwanted data to make it small enough to fit on an A3 (or A4 sized) page and to leave enough room for the map legend, logos, scale bar, rogaine title etc. WARA prefers that any map improvements, like the redrawing of poorly mapped roads, deletion of buildings that no longer exist, adding in of newly built dams etc be made on the uncropped version to be of maximum usefulness to setters who may return to the area and use your maps to set future events. **Therefore, it is recommended that you DO NOT crop your map until all fieldwork is complete. At the minimum, an electronic copy of both the uncropped map and the final competition map should be given to the map banker after the event.**

- Select any line or area symbol (like major road or plantation)

- Select the *draw paths* tool . Alternatively, if you want to crop your map to a simple rectangle, select the *draw rectangles* tool .
- Draw a rectangle or polygon around the competition map. Any map features that fall inside this shape will be retained and any that fall outside will be deleted.
- When finished drawing, make sure the shape you just drew is the only object selected.

- Select the Cut-out tool from the toolbar. Your newly drawn shape will disappear and be replaced with a red border.
- Press **Return** (above the shift key). Everything outside the red border will be deleted.
- Press **Del** on your keyboard. This will remove the shape you drew earlier.

Placing logos and scale bars

There are certain logos that must appear on every WARA map. These are the rogaining logo, the LotteryWest logo and the Department of Sport and Recreation Logo (see right). WARA receives financial support from the latter two bodies and displaying their logo is an important recognition of this fact. Logos for other businesses must also be shown on the map if they are sponsoring your particular event. Every map must also include a scale bar. To place a logo/scale bar:

- Select the *Edit Objects* tool
- *Left-click* the symbol you want place from the symbols palette
- *Left-click* the map to place the logo/scale bar.
- If you want to shrink or enlarge the logo, *right-click* on the symbol icon in the symbols palette, then choose **Scale…**
- Enter a percentage scale value, then click **Okay**. Obviously the scale bar should never be scaled *under any circumstances*!

Map Legend

Your competition map should show a legend that contains every symbol used on the map. All symbols not used should be deleted. In the standard symbols set file (available from the WARA website), there is an example legend that contains common symbols. There is also a supplementary table that contains all of the less common symbols. To build a legend specifically for your map, copy the appropriate legend entries from the standard symbol set and paste these onto your competition map.

Including custom artwork

Some cartographers like to jazz up their maps by including artwork or photographs. To include artwork on your map:

- Make sure your image is saved in one of the following file formats: bmp, gif, jpeg, jpg, tif, tiff or png.
- In OOM, select **Template >> Template** setup Window…
- The template window should have appeared. In the lower left hand corner, *click* the green + symbol, then click **Open…**

- Navigate to and choose your artwork file, then click **Open**
- A dialogue will appear. Select "**Meters per pixel**" , type 10 into the box, then click Open. The artwork should appear at the centre of the map window.
- To scale the artwork, got to the Templates window and select **Edit >> Positioning…** The positioning dialogue box will appear.
- Alter the X-scale and Y-scale values to change the size of your artwork. Normally you would set these to the same value otherwise you will squash your image.
- When happy with the size, to reposition the artwork, go to the Template window and choose the *Move by Hand* tool.
- *Left-lick and drag* the artwork to the desired position

Printing maps for fieldwork

Printing your map on a home or work printer is fairly straightforward:

- Select **File >> Print** to access the print dialogue.
- Select the printer you want to use from the *Printer* drop down box.
- Choose the appropriate page size (A3 or A4) and orientation (landscape or portrait). You will notice that the map area has become dark except for a white area in the centre which represents the printed page. This white area will change in response to the options you set.
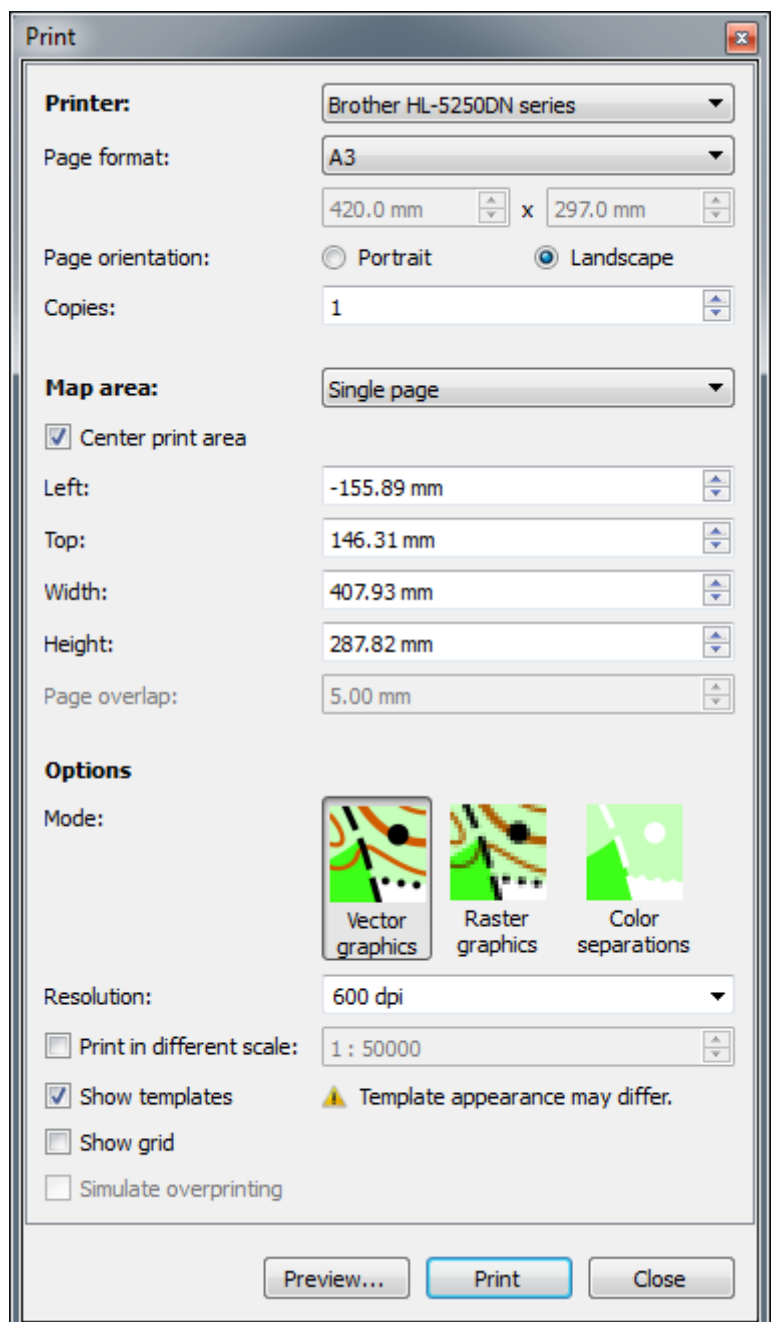
If you want to print an A3-sized map but only have an A4 printer do the following:

- Set *Map Area* to **Custom Area**
- Set the *Page Format* to **A4**
- If you are printing a portrait A3 map select **Landscape**. Likewise if you are printing a landscape A3 map, select **Portrait**.
- Check **Center print area**
- *Click and drag* the red border of the printed area so that it is large enough to cover your map.
- You should now see something like that in the image on the next page. To finish, click **Print** then trim one page and tape or glue the two A4 pages together along the overlap region.
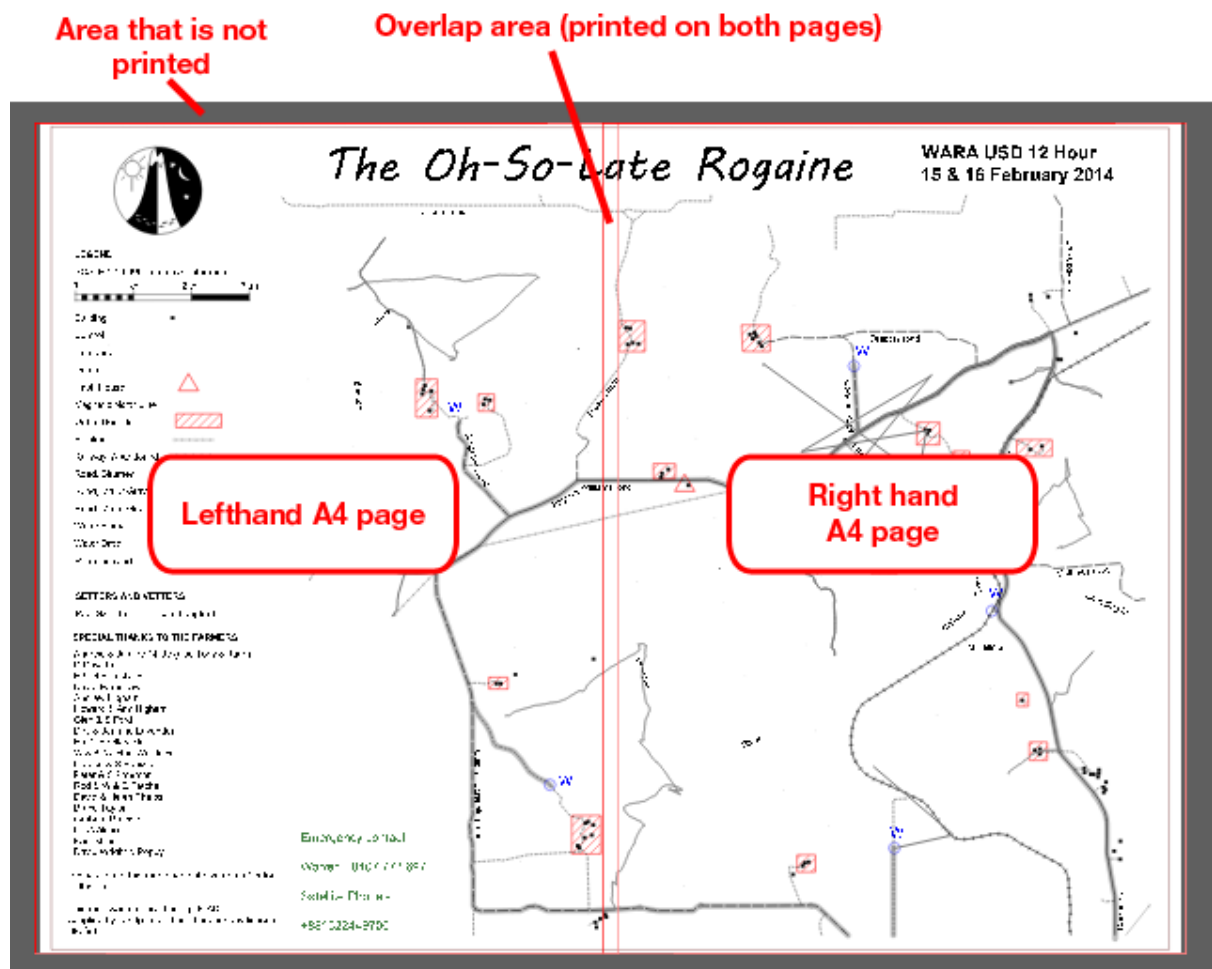
Printing competition maps

Competition maps must be printed by a professional printer. The professional printer will require the map to be supplied in PDF format. To create a PDF, do the following:

- Select **File >> Export as… >> PDF** to open the PDF export dialogue. This dialogue is exactly the same as the print dialogue, except the *Printer* option is missing.
- Set the *page format* to the appropriate size (**A3** or **A4**) and the appropriate *page orientation* (**landscape** or **portrait**)
- Set *Map area* to **Single Page**
- Check **center print area**
- Make sure **Vector graphics** mode is selected. <mark>This step is important.</mark>
- If you have added any templates (background images), make sure **Show templates** is checked and that the *resolution* is set to a value between **300dpi** and **600dpi**.
- If you need to make your page just a little bit taller (or wider) than a standard A3 or A4 page to fit your map then you may set a custom page. From the Page Format drop down box select **Custom** then type in your desired page height and width. However, under no circumstances should the printed map exceed 450mm on the longest side and 320mm on the shortest side.
- Click **Export** to finish. The result can be viewed in any PDF viewer (Adobe Acrobat reader is one such viewer that is available for free online).

Before giving the go ahead to print out hundreds of copies you should ask the professional printer for a proof. You must ensure that the printed colours look okay, particularly appearance of green plantation areas, grey rock surfaces and grey patrolled roads. These features, and features drawn on top of them, like contour lines, should be easily readable at night. If you find the colours wanting, you can change the colours in the OMAP file as required or ask the printer to change the colours in the PDF.

Appendix A — Drawing tool, keyboard and mouse combinations

	——————————— Drawing tool ———————————			
	⌇	▢	◯	✎
Left-click	Places a point that will be followed by a straight line.	Places a point in a straight-sided shape.	Places first point in a circle. A second *left-click* closes the circle.	Does nothing
Left-click and drag then *release*	Places a point that will be followed by a curved line **Note:** To get a curved line segment, you must do this at least twice in a row.	*Left-click* places a corner point in a straight-sided shape, *drag* allows you to set the direction and length of the line and *release* finishes the line/places the next shape corner point.	*Left-click* places the first point in a circle, *drag* enlarges the circle to desired size and *release* finishes the circle.	*Left-click* starts the freehand line, *drag* places short lines segments following your mouse cursor and *release* ends your line.
Right-click	After you have started drawing a path, *right-click* finishes a path and does include the last point (the place where you right-clicked) in the shape.		After you have started drawing a circle, *right-click* finishes the circle ***Note***: To draw an ellipse, *left-click*, then *right-click and drag*, then *release*.	Does nothing
Double left-click	After you have started drawing a path, *double left-click* finishes a path and **does not** include the last point (the place where you double left-clicked) in the shape.		Does nothing	
Return Key (i.e. the key above **Shift** — the key in the number pad won't work!)	After you have started drawing a path, pressing **Return** finishes the path and converts it to a closed shape by joining the first point to the last point.	Same behaviour as *double left-click*.	Does nothing	
Hold **Shift** key then *left-click*	This will cause the program to force the next point to go directly over top of an existing point or line. This is known as snapping. It is very useful, for example, when you want to draw two intersecting lines or place a control circle directly over a watercourse.		Does nothing	

Appendix A — Drawing tool, keyboard and mouse combinations

	————————— Drawing tool —————————			
Hold **Shift** key then *left-click and drag*	After you have started drawing a path, this combination will allow you to trace existing lines and areas. Nifty!	Does nothing		
Backspace Key	After you have started drawing a path, the **Backspace** key deletes the last point drawn.		Does nothing	
Esc Key	After you have started drawing a path, pressing **Esc** at any time will abort drawing.			
Hold **Ctrl** key	After you have started drawing a path, holding the 'Ctrl' key displays a light blue asterisk. The next line segment is forced to align to with one of the blue lines.		Does nothing	
Hold **Ctrl** key then *left-click*	Before starting to draw a shape, by holding the **Ctrl** key then left-clicking on a pre-existing line or shape, a blue crosshair will appear. Release the **Ctrl** key. This crosshair will force the new line to be drawn either parallel or perpendicular to the pre-existing line. To remove the crosshair, press the **Ctrl** key.		Does nothing	
Press **space bar**	Turns dash points on and off. This is only important for lines that are dashed (like minor roads). For more information see the dash points section.		Does nothing	

Appendix B — Drawing magnetic north lines

The instructions below assume that the map has been properly georeferenced. Please see the Georeferencing section and ensure this is the case before proceeding.

Magnetic north lines need to be drawn at a particular angle and with a particular spacing. One strategy to achieve this is to draw these lines on blank map, then copy and paste them onto your course map. To do this:

- Select File >> New… and the Create new map dialogue will appear.
- Click on the Scale dropdown box and type in your map scale (25,000 or 50,000)
- Select Empty symbol set from the list of options
- Click Create

Now we will set up a grid that we will use to space and align the north lines

- Select Map >> Configure Grid and a dialogue will appear.
- Place a check next to show grid
- Set the Unit dropdown box to millimetres on map.
- Change Horizontal spacing to 30.0mm (or 40.0mm if you want your north lines spaced further apart).
- Change Vertical spacing to 420.0mm.
- Click OK
- The grey map editor window will be replaced with tall grey rectangles. If you only see vertical lines, zoom out a bit and they will appear.

Before we can draw the north lines, we need to import the magnetic north line symbol from your map. To import the symbol:

- Select Symbols >> Replace Symbol Set…
- Navigate to your map, select it, then click Open
- The Replace symbol set dialogue will appear. Click OK

We are now ready to draw the magnetic north lines:

- Select the magnetic north line symbol in the symbols window
- Ensure the Draw Paths tool is activated
- Hold the **Shift** key and position the mouse cursor near the intersection of two grid lines
- When a blue cross appears, left click once.
- While still holding shift, move the mouse curse up the screen to the next intersection until a blue cross appears.
- Right-click.
- Repeat this process until you have drawn about 20 parallel lines.

Next, the magnetic north lines need to be rotated to the correct angle relative to the map. To calculate this angle:

- Go back to your competition map
- Right-click the coordinates in the status bar (lower right hand corner of OOM) and select Latitude/Longitude (DMS).
- Hover the mouse cursor over the centre of the map (rough enough is good enough), then write down the coordinates that appear in the lower right hand corner.
- Open your web browser and go to http://www.ga.gov.au/oracle/geomag/agrfform.jsp
- Enter the coordinates of your map centre, then click submit.
- The form will return a '**D**' value of around -2°. Record this value.
- Go back to your competition map in OOM
- Select Map >> Map Georeferencing
  Record the grivation value (call this angle G1). G1 is usually zero.
- Now, enter 0.00° into the Declination field. The grivation field will then read something like -0.49°. Record your value (call this angle G2).
- To close the dialogue without making changes, click Reset, then click Cancel
- Now, evaluate the following formula:

$$D + G1 - G2 = R$$

To apply the rotation to the lines:
- Go back to the OMAP file where you drew your magnetic north lines.
- Select Map >> Rotate Map…
- Enter the value of **negative** R e.g. if your calculated R value is -2.53°, enter +2.53°
- Click Okay

Finally, copy and paste your properly spaced and angled magnetic north lines onto your map:

- Use the edit tool to select all of the magnetic north lines, then select Edit >> Copy
- Go back to your competition map
- Centre the map on your screen by pressing Show whole map
- Select Edit >> Paste
- Click and drag the pink dotted border to position the magnetic north lines as required.
- The north lines will hang over the edge of your map area. Do not go to the trouble of adjusting the length of each line manually. Rather, when it comes time to crop your map (see cropping your map section), the magnetic north lines will also be cropped.

How do you check if you got the right result?

- Your magnetic north lines should slant slightly to the left of north i.e. slightly towards north west.