DRAFTLIGHT

VESSEL SHAPE · VESSEL & ROV SHAPES

User Manual

Vessel, ROV and subsea equipment outlines
for navigation software

Version 1.0 · formerly The Shape Builder

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Contents

1 Introduction **3**

2 Getting started **3**
2.1 What you need 3
2.2 Installing 3
2.3 Starting the program 3

3 The main window **4**

4 Coordinates and the CRP **4**
4.1 Moving around the drawing 5
4.2 Snap 5

5 Drawing shapes **5**

6 Templates **6**

7 Editing shapes **7**
7.1 The shapes list 7
7.2 The selected shape 7
7.3 Points 7

8 Move, rotate, mirror and the CRP **8**
8.1 Moving, rotating and scaling 8
8.2 Mirror copy to port 8
8.3 Moving the CRP 8

9 Tracing a drawing **9**

10 Simplify (smaller files) **9**

11 Files **11**
11.1 Projects 11
11.2 Opening .shp and DXF files 11
11.3 Exporting 12

12 Trial and licence **12**

13 Troubleshooting **12**

Appendix: quick reference **13**
Keyboard shortcuts 13
Colours 13
The .shp file layout 13

1 Introduction

DraftLight - Vessel Shape draws the outlines that navigation software shows for a vessel, an ROV or a piece of subsea equipment. Everything is drawn in metres around a reference point, the **CRP**, so the outline sits in exactly the right place when it is loaded into the navigation system. With it you can:

- draw outlines with the mouse on a metre grid, or type and paste X / Y points;
- start from ready-made shapes: a vessel hull, an ROV, a TMS, a clump weight, circles, rectangles, polygons, arrows and a CRP marker;
- add an arrow showing the shape's forward direction;
- move, rotate, mirror and scale shapes, and move the CRP;
- trace over a scaled drawing or photo, such as a GA drawing;
- simplify large drawings converted from CAD so the files are much smaller but look the same;
- open and save .shp shape files, open and save DXF drawings, and save projects to carry on later.

> **Note**
> DraftLight - Vessel Shape was called **The Shape Builder**. Only the name and the look have changed: your projects (.shapebuilder files), shape files and licence carry straight on.

2 Getting started

2.1 What you need

- A Windows PC.
- The program file, **DraftLight-VesselShape.exe**. Nothing else needs to be installed.

2.2 Installing

Copy **DraftLight-VesselShape.exe** into a folder of your choice, for example a folder in Documents or on the desktop. There is no installer.

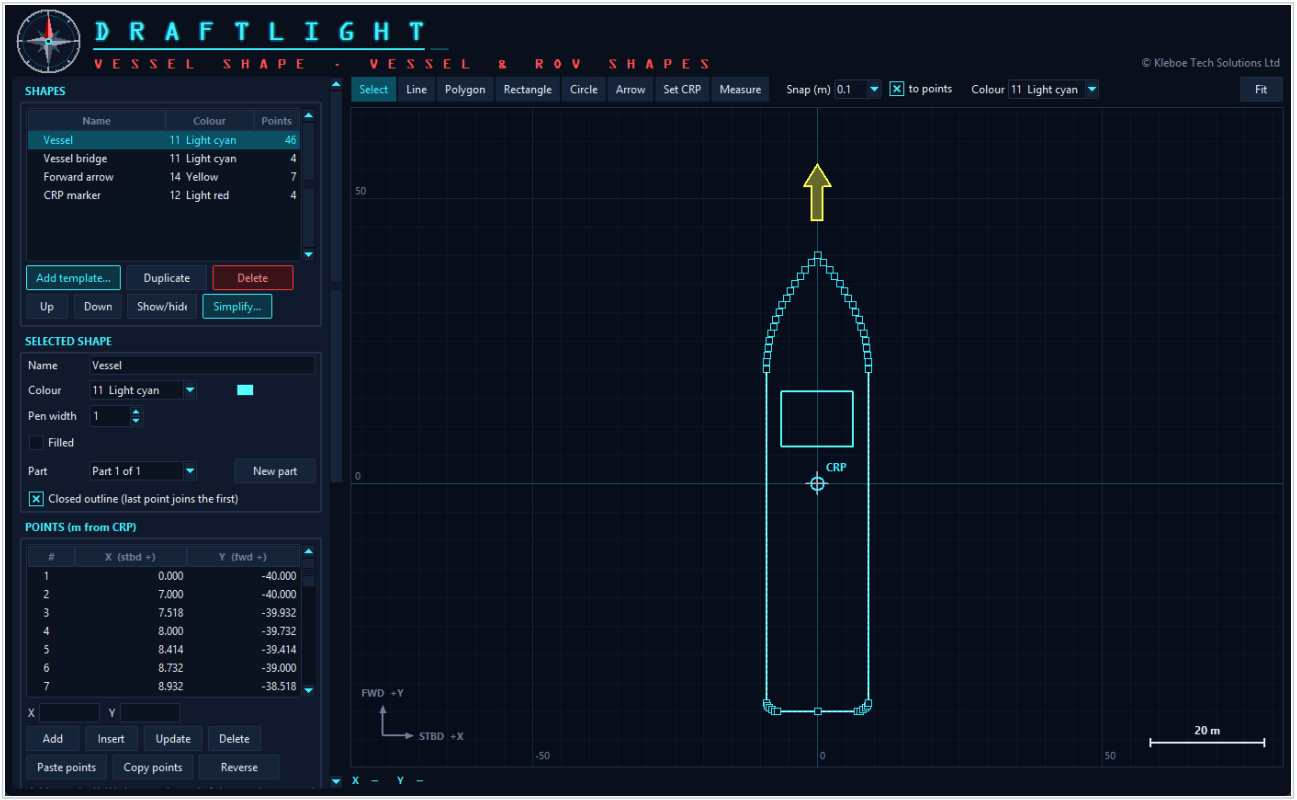
> **Tip**
> For quick access, right-click DraftLight-VesselShape.exe and choose **Send to > Desktop (create shortcut)**, or pin it to the Start menu or taskbar.

2.3 Starting the program

Double-click **DraftLight-VesselShape.exe**. You can also drag a .shp file, a DXF file or a saved project onto the program's icon (or use **Open with**) to start with that file open.

> **Note**
> The first time you start the program, Windows may show a **Windows protected your PC** message. Click **More info**, then **Run anyway**.

3 The main window



The main window with a vessel made from the Vessel template, a forward arrow and a CRP marker. The vessel is selected, so its points are listed on the left.

- **Menus**: File (projects, import and export), Edit (undo, templates, simplify), View (zoom, grid) and Help.
- **Left panel**: the list of shapes, the selected shape's settings and points, move / rotate / mirror, the background image and export. Scroll it with the mouse wheel if it doesn't all fit.
- **Toolbar** above the drawing: the drawing tools, the snap setting and the colour for new shapes.
- **Drawing area**: the shapes on a metre grid, with the CRP marked, a direction key (bottom left) and a scale bar (bottom right).
- **Status bar** under the drawing: the mouse position in metres from the CRP, and a hint for the tool in use.

4 Coordinates and the CRP

All positions are in **metres from the CRP** (0, 0):

Axis	Positive	Negative
X	Starboard	Port
Y	Forward	Aft

So a point 10 m forward and 2 m to port of the CRP is X –2, Y 10. The CRP is drawn as a cyan circle and cross, with the grid's two axis lines running through it. The forward direction is always up the screen.

4.1 Moving around the drawing

To	Do this
Zoom in or out	Turn the mouse wheel; the point under the mouse stays still. Or press + and –.
Pan	Drag with the right (or middle) mouse button, or drag an empty part of the drawing with the Select tool.
See the whole drawing	Click **Fit** or press F.
Go back to the CRP	View › Centre on CRP.

4.2 Snap

When you draw or drag points, they are rounded to the **Snap** step on the toolbar (0.01 m to 5 m, or Off). With **to points** ticked, points also jump onto any existing point, or the CRP, when the mouse is close to it, so outlines join up exactly.

5 Drawing shapes

Choose a tool on the toolbar. New shapes take the colour chosen in **Colour** on the toolbar; you can change it afterwards.

Tool	How to use it
Select	Click a shape to select it. Drag it to move it. Drag one of its square handles to move that point.
Line	Click to add points. Double-click, press Enter or right-click to finish. Backspace removes the last point; Esc cancels.
Polygon	As Line, but the outline is closed. Click the first point again to close and finish it.
Rectangle	Drag from one corner to the opposite corner.
Circle	Press at the centre and drag out to the radius. The circle is made of 36 points.
Arrow	Drag from the tail to the tip to show the shape's forward direction. The direction snaps to 15° steps and the status bar shows its length and direction.
Set CRP	Click the point that should become the CRP (see section 8.3).
Measure	Drag between two points to see the distance, the direction (bearing from forward) and the X and Y differences.

> **Tip**
> Keyboard: **S** selects the Select tool, **L** the Line tool and **P** the Polygon tool. **Ctrl+Z** undoes and **Ctrl+Y** redoes almost anything.

6 Templates

Click **Add template...** (Ctrl+T), choose a shape, then fill in its sizes. All sizes are in metres.

Settings for the Vessel template.

Template	Settings
Vessel (hull)	Length overall, beam, bow length (the curved part), stern corner radius, the CRP's position forward of the stern and to starboard of the centreline, and an optional bridge outline.
ROV	Length, width, the CRP's position aft of the front, and an optional yellow heading arrow in front.
TMS / cage	Diameter, with an optional cross through the centre.
Clump weight	Width and length (a filled rectangle).
Rectangle	Width (X), length (Y), centre position, filled or not.
Circle	Diameter, centre position, number of segments, optional cross, filled or not.
Polygon (N sides)	Number of sides, diameter and centre position.
Heading arrow	Length and width; points forward from the CRP.
CRP marker (cross)	Size of the cross drawn at the CRP.

Every template also has a name and a colour. Templates are placed around the CRP, ready to move, rotate or edit like any other shape.

7 Editing shapes

7.1 The shapes list

Every shape is listed with its colour and number of points. Click a shape in the list or on the drawing to select it.

Button	What it does
Add template...	Adds a ready-made shape (section 6).
Duplicate	Makes a copy of the selected shape (Ctrl+D).
Delete	Deletes the selected shape (Delete key).
Up / Down	Changes the order; shapes lower in the list are drawn on top.
Show/hide	Hides a shape. Hidden shapes are not exported.
Simplify...	Reduces the number of points (section 10).

7.2 The selected shape

Setting	What it does
Name	The shape's name in the list (and the layer name in a DXF export).
Colour	One of 16 colours, numbered 0 to 15 (see the appendix).
Pen width	The line thickness, 1 to 9.
Filled	Fills the inside of the shape with its colour.
Part	A shape can be made of several separate parts, such as a box and the lines inside it. Choose which part's points to show; **New part** adds an empty one.
Closed outline	Joins the part's last point back to its first.

7.3 Points

The **POINTS** table lists the selected part's points in metres from the CRP. Click a point to highlight it on the drawing and put its values in the X and Y boxes.

Button	What it does
Add	Adds the X / Y typed in the boxes to the end of the part. With no shape selected, it starts a new shape.
Insert	Adds the X / Y before the selected point.
Update	Changes the selected point to the X / Y typed (or press Enter in the box).
Delete	Deletes the selected point.
Paste points	Takes X and Y pairs copied from Excel or a text file, one per line. They are added to the selected part, or made into a new shape.
Copy points	Copies the part's points (X and Y, tab separated) to paste into Excel.
Reverse	Reverses the order of the points.

> **Tip**
> To make a shape from a drawing's dimensions, type the corners into Excel in two columns, copy them, and click **Paste points**.

8 Move, rotate, mirror and the CRP

Choose whether the buttons in **MOVE, ROTATE, MIRROR** act on the **Selected shape** or **All shapes**.

8.1 Moving, rotating and scaling

Button	What it does
Move...	Moves by a distance to starboard (X) and forward (Y). Use negative values for port and aft.
Rotate...	Rotates clockwise by an angle, about the CRP or the centre of the shape(s).
Scale...	Makes shapes bigger or smaller by a factor, for example 0.001 to turn a drawing made in millimetres into metres.
Mirror port / stbd	Mirrors from side to side about the centreline.
Mirror fwd / aft	Mirrors from front to back.

8.2 Mirror copy to port

Most vessels and ROVs are symmetrical, so you only need to draw one side. Draw the starboard half as a line that starts and ends on the centreline (X = 0), select it and click **Mirror copy to port**. The port side is added and joined into one closed outline.

8.3 Moving the CRP

If a drawing is made from another reference point (the stern, say), move the CRP to the right place in one of two ways:

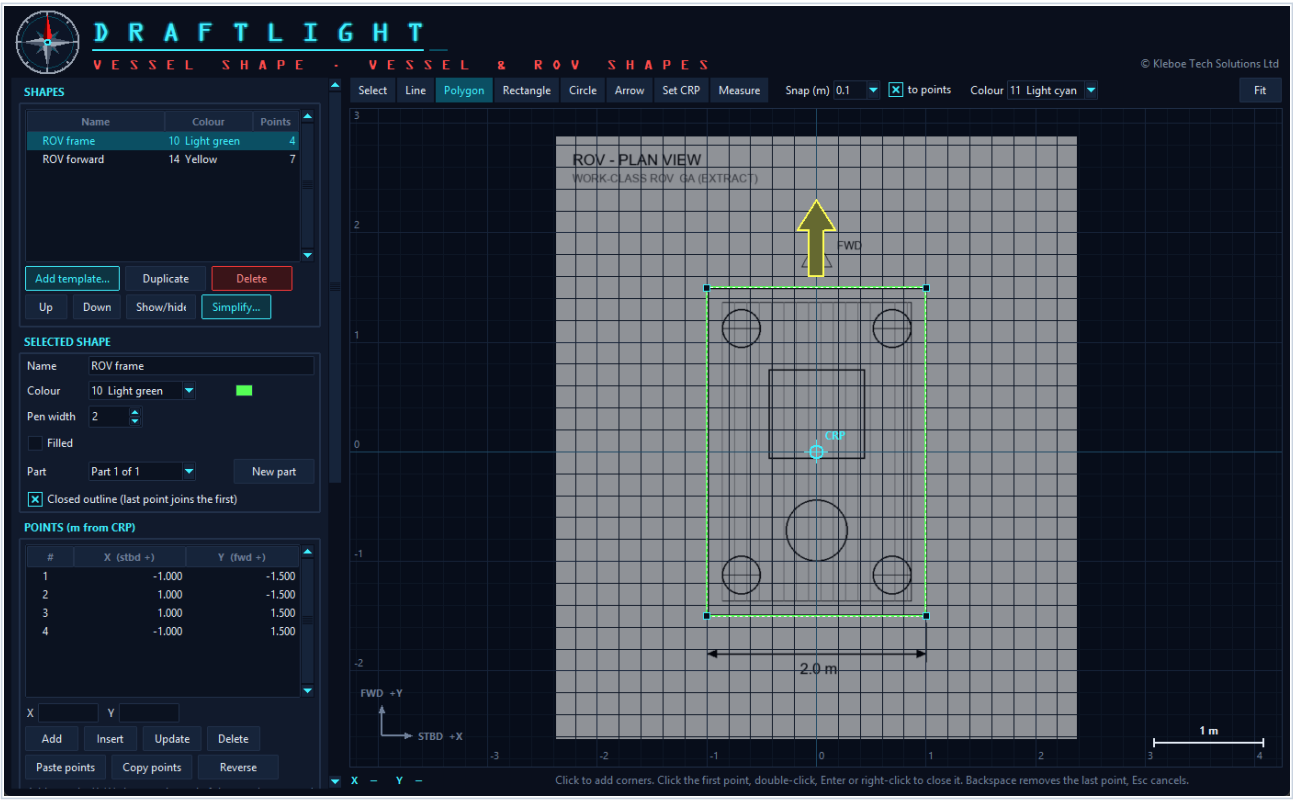
- choose the **Set CRP** tool and click the point that should be the CRP; or
- click **Move CRP to...** and type where the CRP is in the drawing's current coordinates.

The whole drawing, including any background image, moves so that point becomes 0, 0. For example, a hull drawn with the stern at Y 0 and the CRP 32.5 m forward on the centreline: Move CRP to X 0, Y 32.5.

9 Tracing a drawing

Load a GA drawing, a scan or a photo of the vessel or equipment and draw over it.

1. In **BACKGROUND IMAGE**, click **Load image...** and choose a PNG, JPG, BMP, GIF or TIFF file.
2. Click **Set scale**, then click two points on the image that are a known distance apart (a dimension line, or the overall length). Type the real distance in metres.
3. Choose the **Set CRP** tool and click the CRP on the image.
4. Trace the outline with the **Polygon** or **Line** tool. Turn **to points** snap off if it pulls the mouse onto points you don't want.

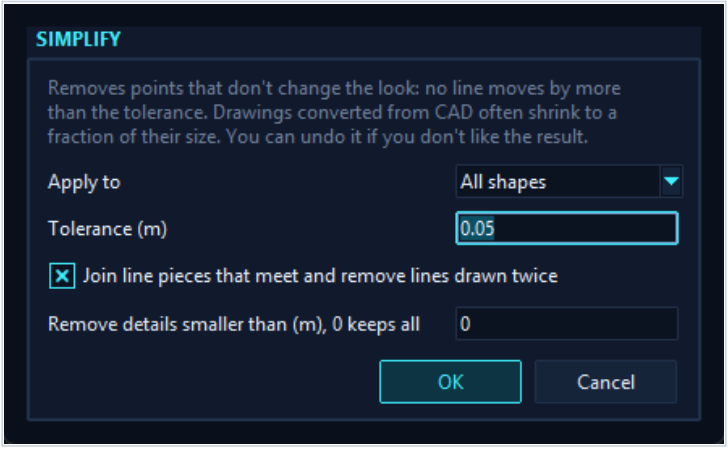


Tracing an ROV drawing: the image has been scaled using its 2.0 m dimension and the CRP set at the centre of the ROV.

Use the **Brightness** slider to fade the image so your outline stands out, and untick **Show** to hide it. The image is not exported. Projects remember the image, its scale and its position.

10 Simplify (smaller files)

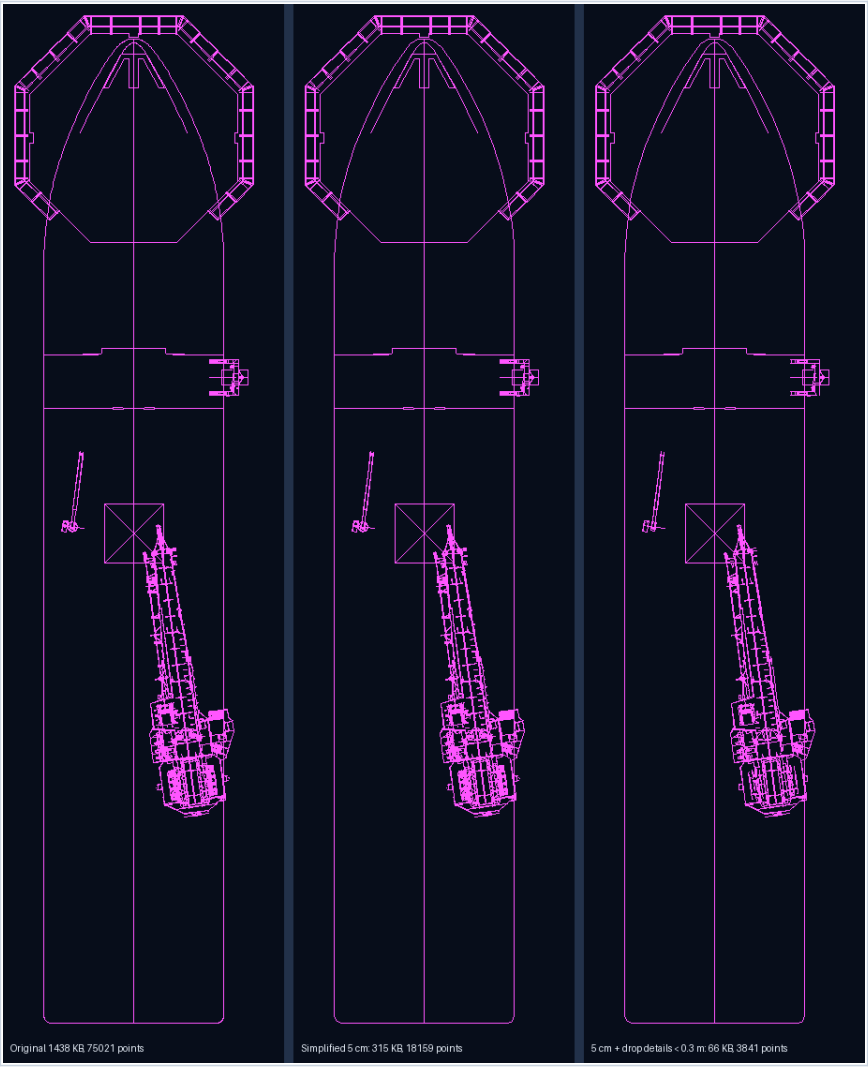
Drawings converted from CAD are often far bigger than they need to be: every short piece of line is stored separately, some lines are drawn twice, and curves have many more points than a navigation display needs. **Simplify...** removes the points that don't change the look.



The Simplify settings.

Setting	What it does
Apply to	The selected shape, or all shapes.
Tolerance (m)	The furthest any line may move. 0.05 m (5 cm) is invisible at vessel scale; use 0.01 m for small equipment.
Join line pieces...	Joins pieces of line that meet into continuous lines and removes lines drawn twice.
Remove details smaller than (m)	Leaves out small parts such as bolts, hatching and text. 0 keeps everything.

When it has finished, the program shows the number of points and the .shp file size before and after. Check the drawing, and press **Ctrl+Z** if you want it back as it was.



A vessel drawing: original (left), simplified with a 5 cm tolerance (centre) and with details under 0.3 m removed as well (right).

	Points	.shp file size
Original	75,021	1,438 KB
Tolerance 5 cm	18,159	315 KB
Tolerance 5 cm, details under 0.3 m removed	3,841	66 KB

11 Files

11.1 Projects

Save project (Ctrl+S) saves all the shapes, the background image settings and the snap and export settings in a **.shapebuilder** file. **Open project** (Ctrl+O) carries on where you left off. **New** (Ctrl+N) starts an empty drawing. Projects made with The Shape Builder open as they are.

11.2 Opening .shp and DXF files

Import shape (.shp) (Ctrl+I) and **Import DXF** read existing outlines. If a drawing is already open you are asked whether to **replace** it or **add** the file to it.

- In a .shp file, each change of colour and each filled area becomes a shape in the list.

- From a DXF, lines, polylines, circles and arcs are read, one shape per layer. Other items (text, dimensions, blocks) are skipped and listed when the file opens.
- DXF drawings are often in millimetres: use **Scale...** with 0.001 to convert to metres, then **Move CRP** to put the CRP in the right place.

11.3 Exporting

Export	What you get
Export shape (.shp) (Ctrl+E)	The shape file for the navigation software, in metres from the CRP. **Decimal places** in the EXPORT section sets the precision (2 = centimetres).
Export DXF	A DXF drawing (R12) for CAD and other software, one layer per shape.

Hidden shapes are not exported. The file name is taken from the project, or from the first shape.

12 Trial and licence

The program runs as a free 48-hour trial with everything working. The bar under the title shows how long is left:

The trial bar.

After that it needs a Survey Software Utilities licence key: click **Enter licence key…**, paste the key from the email and click **Activate**. One key unlocks every Survey Software Utilities program on the PC, on up to 4 PCs. With a licence the bar goes, and the window title shows **Licensed until** and the date. The licence is checked online now and then and works for up to 30 days at a time without internet.

13 Troubleshooting

Problem	What to check
The shape is in the wrong place in the navigation software	Check the CRP: the navigation software places 0, 0 at its CRP. Use Set CRP or Move CRP.
The shape is the wrong way round	Forward must be +Y (up the screen) and starboard +X. Use Rotate or the Mirror buttons.
The shape is far too big or small	The source was in different units. Use Scale... (0.001 for millimetres).
Points jump to the wrong place while drawing	Untick **to points**, or set Snap to a smaller step or Off.
A shape doesn't appear in the export	It is hidden: select it and click Show/hide.
The drawing is slow with a large file	Use Simplify... to reduce the number of points.
Nothing found in a DXF	The drawing may use blocks or 3D items. Explode them in the CAD program and save as DXF again.

Appendix: quick reference

Keyboard shortcuts

Keys	Command	Keys	Command
Ctrl+N	New drawing	Ctrl+Z / Ctrl+Y	Undo / redo
Ctrl+O	Open project	Ctrl+T	Add template
Ctrl+S	Save project	Ctrl+D	Duplicate shape
Ctrl+I	Import shape (.shp)	Delete	Delete shape (or point)
Ctrl+E	Export shape (.shp)	F	Fit the drawing
S / L / P	Select / Line / Polygon tool	+ / –	Zoom in / out
Enter	Finish a line or polygon	Esc	Cancel drawing
Backspace	Remove the last point drawn	F1	Quick guide

Colours

Shapes use colour numbers 0 to 15:

0 Black	**1** Blue	**2** Green	**3** Cyan
4 Red	**5** Magenta	**6** Brown	**7** Light grey
8 Dark grey	**9** Light blue	**10** Light green	**11** Light cyan
12 Light red	**13** Light magenta	**14** Yellow	**15** White

The .shp file layout

A .shp shape file is plain text with one instruction per line, **value; value; code**, in metres from the CRP:

Code	Meaning
–2	Move to X, Y (start a new line)
–1	Draw a line to X, Y
3	Set the colour (first value = colour number)
4	Set the pen width (first value)
10	Start a filled area
7	End a filled area