

Introduction to ArborShadow

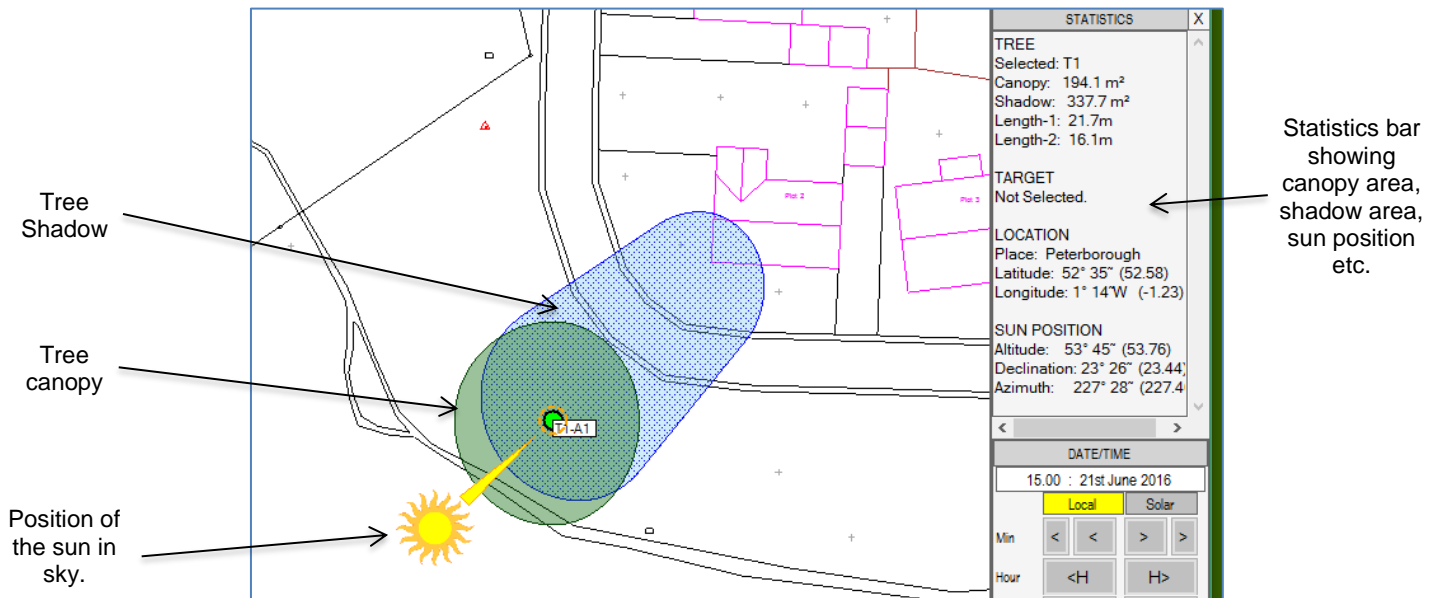
ArborShadow is a windows-only utility designed to display tree shadows on a CAD drawing or image. Target areas can also be plotted (such as a garden) and be analyzed against the tree shadows to produce a graph showing times and duration of shadow incursion. Other features include the display of building shadows, Animation of shadows (and export as a video file), CAD export to AutoCAD (or as a DXF file) and Import of tree data (from Excel, Axciscape, ArborCAD).

Basics

Tree data can be imported or entered manually via the List window or the Edit Window. To create a shadow the program requires the four cardinal maximum crown extents for north, south, east and west; the tree height, lower crown height and a value to represent the percentage of upper canopy to lower canopy. As an example, in the case of a broad tree canopy where the upper canopy matches the extents of the lower canopy, its percentage value would be set to 100%. If the top of the tree is a point (so the tree has a conical shape) the percentage value would be set to 0%. Normally a typical tree would be set between 60-80%.

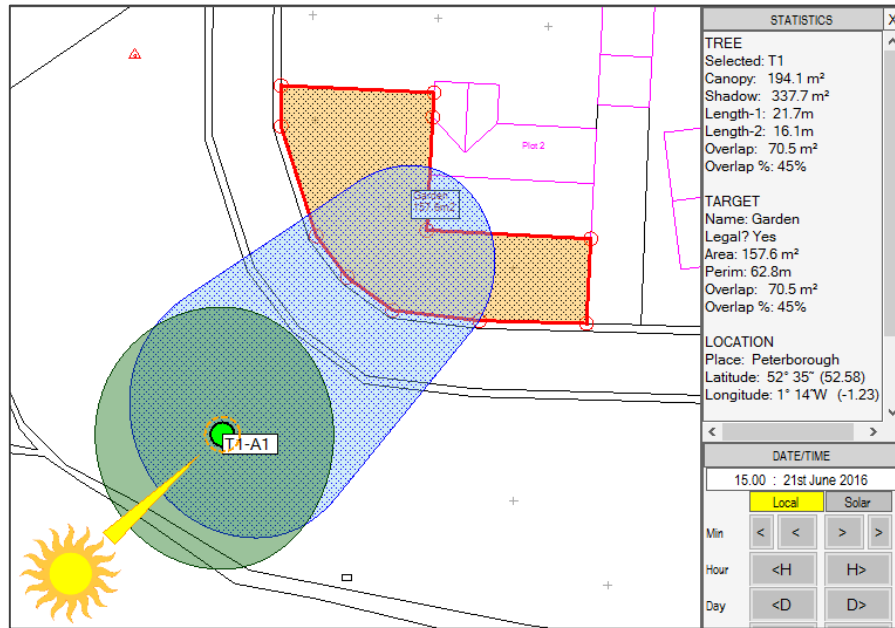
The map displays the tree position as a filled circle and label. The canopy is also shown using the four cardinal crown extents for north, south, east and west. Remember we are looking vertically down over the tree.

Using the tree data a shadow is created (see below).



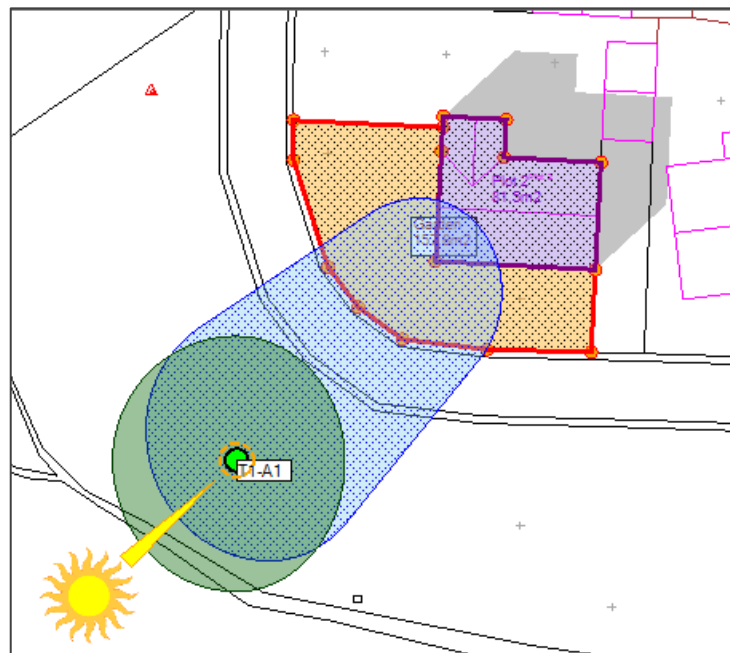
A target area can be plotted onto the map to represent a garden or other item. As a shadow overlaps the target area the percentage of overlap can be read from the statistics bar. The Analysis function (see additional help pdf) uses the target to create a graph showing extents of overlap throughout the year.

The image below shows a shadow overlapping a target area labelled 'Garden'. The shadow overlaps 45% of the area.



An option to define structures (such as buildings) is also available. The image below shows a structure plotted with a height of 8.5m. Its shadow can be seen as gray solid hatch.

The use of structures are intended for visual effect only and are not included in any analysis at this time.



As most surveyed trees are not fully mature an option exists to enter 'ultimate' canopy and height values. These would represent the expected ultimate dimensions should the tree reach full maturity. Selecting the two override icons will activate these and adjust the display providing the data is present.

Edit Tree Attributes

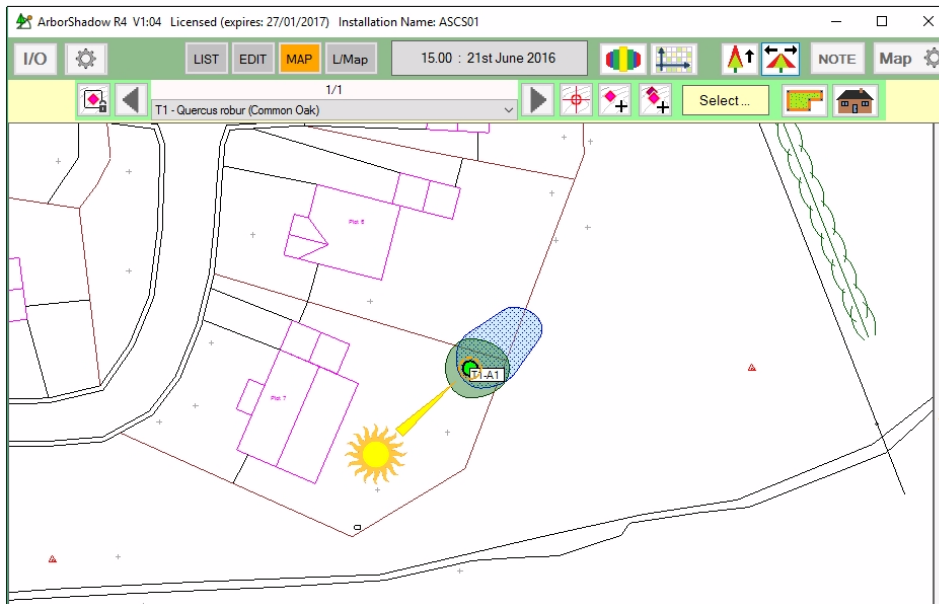
Type T Tag 1 > Category A1 Name Quercus robur (Common Oak)

Heights	Canopy	Copy/Increment Canopy values to Ultimate Canopy Copy >> ?	Ultimate Canopy
Tree Height 8 + >	North 3 + >		U-North 11 + >
Ult Tree Height 25 +	East 4 +	U-East 12 +	
Crown Height 2 +	South 3 +	U-South 11 +	
	West 2.5 +	U-West 10.5 +	

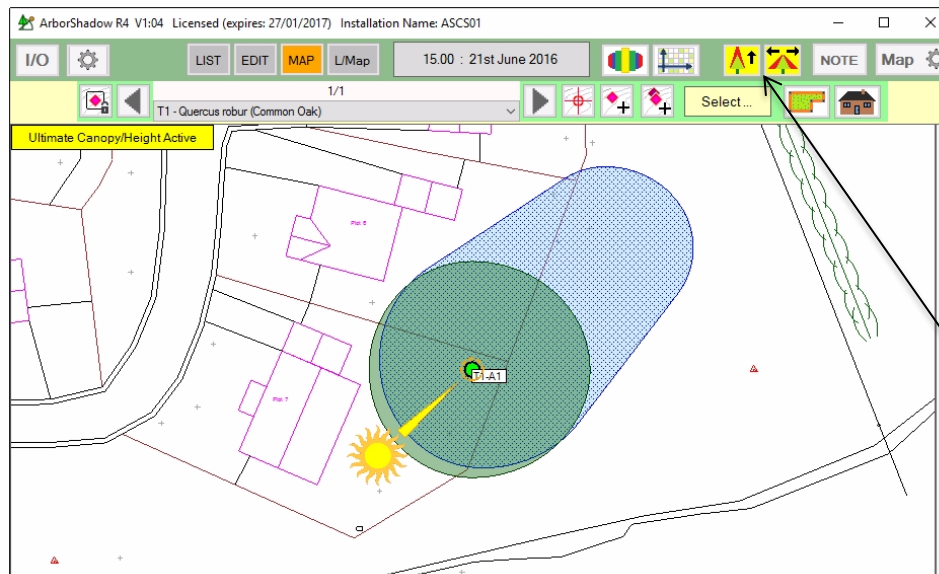
Upper Canopy Percentage % 25% 50% 60% 75% 80% 100% 75 ?

Cancel Adjust Field Settings Marked Disabled ? Modify XYZ OK

The edit window showing the ultimate tree height and canopy values.



Map display using normal height/canopy values.



Map display using Ultimate height/canopy values. Note the yellow alert message and the highlighted ultimate icons.

The main screen

Opens the I/O interface window giving access to load, save, import, export, draw to CAD, etc.

System settings and tools enables list screen item size to be changed. Fields can be modified and processed in various ways.

Window view controls

Date/Time Display

Open Analyzer Window

Set Latitude & Longitude

Activate ultimate canopy and height

User Notes

Gives access to the Map display/export settings.

	Type	Tag	Name	Height	Ultm H
T1	T	1	Populus tremula (Aspen)	22	25
T2	T	2	Populus tremula (Aspen)	21	25
T3	T	3	Populus tremula (Aspen)	21.5	25
T4	T	4	Populus tremula (Aspen)	22.5	25
T5	T	5	Populus tremula (Aspen)	25	28
T6	T	6	Populus tremula (Aspen)	24	28
T7	T	7	Populus tremula (Aspen)	22	25
T8	T	8	Crataegus monogyna (Haw...	8	9
T9	T	9	Crataegus monogyna (Haw...	8	9
T10	T	10	Crataegus monogyna (Haw...	7.5	8
T11	T	11	Crataegus monogyna (Haw...	7.5	8
T12	T	12	Crataegus monogyna (Haw...	8	9
T13	T	13	Crataegus monogyna (Haw...	8	9
T14	T	14	Crataegus monogyna (Haw...	8	9
T15	T	15	Crataegus monogyna (Haw...	7.5	8
T16	T	16	Crataegus monogyna (Haw...	8	9
T17	T	17	Quercus robur (Common O...	19	20
T18	T	18	Pinus sylvestris (Scots Pine)	16	16.5

Manual zoom controls to modify the map zoom (can also be controlled via the mouse wheel)

Map Snap Mode on/off

Date and Time Settings

Zoom item on map

Plot item on map

Add new item

Copy item and add

Menu lists giving a range of functions for the selected column or row

Zoom item and lock zoom

Display previous or next item in list

Plot to map

Add and plot to map

Copy tree and plot to map

Plot target area polygon

Plot structure polygon

	Type	Tag	Name	Height	Ulm H
T1	T	1	Populus tremula (Aspen)	22	25
T2	T	2	Populus tremula (Aspen)	21	25
T3	T	3	Populus tremula (Aspen)	21.5	25
T4	T	4	Populus tremula (Aspen)	22.5	25
T5	T	5	Populus tremula (Aspen)	25	28
T6	T	6	Populus tremula (Aspen)	24	28
T7	T	7	Populus tremula (Aspen)	22	25
T8	T	8	Crataegus monogyna (Haw...	8	9
T9	T	9	Crataegus monogyna (Haw...	8	9
T10	T	10	Crataegus monogyna (Haw...	7.5	8
T11	T	11	Crataegus monogyna (Haw...	7.5	8
T12	T	12	Crataegus monogyna (Haw...	8	9
T13	T	13	Crataegus monogyna (Haw...	8	9
T14	T	14	Crataegus monogyna (Haw...	8	9
T15	T	15	Crataegus monogyna (Haw...	7.5	8
T16	T	16	Crataegus monogyna (Haw...	8	9
T17	T	17	Quercus robur (Common O...	19	20
T18	T	18	Pinus sylvestris (Scots Pine)	16	16.5

STATISTICS

TREE

Selected: T1

Canopy: 194.1 m²

Shadow: 287.7 m²

Length-1: 18.3m

Length-2: 12.3m

TARGET

Not Selected.

LOCATION

Place: Peterborough

Latitude: 52° 35' (52.58)

Longitude: 1° 14'W (-1.23)

DATE/TIME

13.00 : 21st June 2016

Local Solar

Min < >

Hour <H >H

Day <D >D

Month <M >M

Select 21st Month

Snap ON Pwr:100%

The List window displaying the trees in the schedule

The Map window displaying the map (or image) with trees & shadows.

Adding new rows can be carried out from any of the two windows. If adding is selected on the map then you will be first requested to plot its position. If adding from the List window then it's a case of manually selecting the plot button on its window to then fix a map location.

List Window

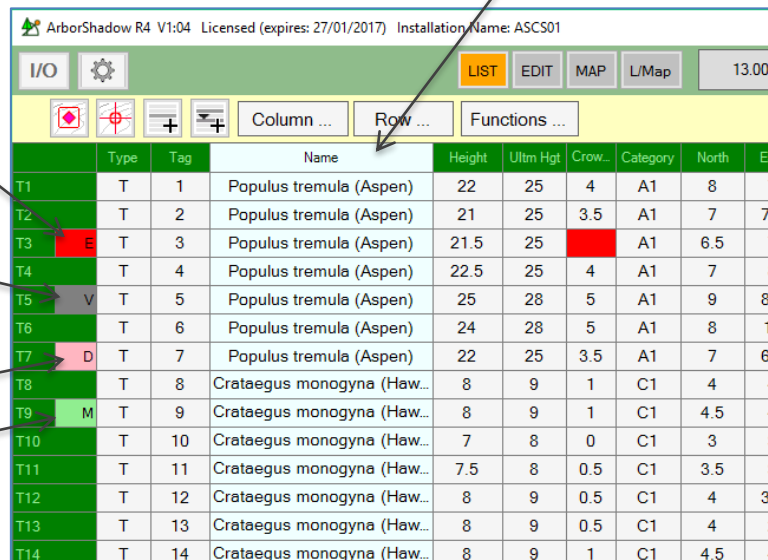
Red highlight with 'E' shows an error exists on the tree. Click on the E to obtain further error information (for this example the crown height is missing).

The 'V' is just to inform you that no map X/Y data is present (the tree hasn't been plotted on the map).

The tree is Disabled.

The tree is Marked.

Clicking a highlighted Field column header opens a menu offering various options which will modify all data held in the column. You can also adjust the column width by holding the mouse button and dragging to the left or right.

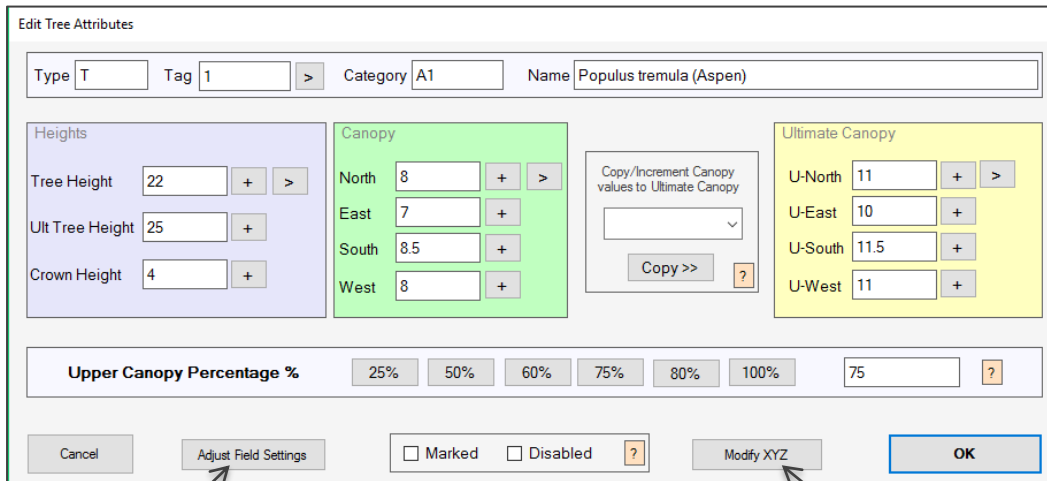


	Type	Tag	Name	Height	Ultn Hgt	Crow...	Category	North	E
T1	T	1	Populus tremula (Aspen)	22	25	4	A1	8	
T2	T	2	Populus tremula (Aspen)	21	25	3.5	A1	7	7
T3	T	3	Populus tremula (Aspen)	21.5	25		A1	6.5	
T4	T	4	Populus tremula (Aspen)	22.5	25	4	A1	7	
T5	T	5	Populus tremula (Aspen)	25	28	5	A1	9	8
T6	T	6	Populus tremula (Aspen)	24	28	5	A1	8	1
T7	T	7	Populus tremula (Aspen)	22	25	3.5	A1	7	6
T8	T	8	Crataegus monogyna (Haw...	8	9	1	C1	4	
T9	T	9	Crataegus monogyna (Haw...	8	9	1	C1	4.5	
T10	T	10	Crataegus monogyna (Haw...	7	8	0	C1	3	
T11	T	11	Crataegus monogyna (Haw...	7.5	8	0.5	C1	3.5	
T12	T	12	Crataegus monogyna (Haw...	8	9	0.5	C1	4	3
T13	T	13	Crataegus monogyna (Haw...	8	9	0.5	C1	4	
T14	T	14	Crataegus monogyna (Haw...	8	9	1	C1	4.5	

Clicking on a highlighted List cell will open a data entry interface. The type of interface will be dependent upon the type of field so a number field (such as height, canopy) will open the number interface where only values can be entered. Clicking on the Type or Category will create a drop down menu for selection. The name field opens a window with options to select a single or multiple name.

Edit Window

This window offers an alternative method for entering tree data with additional controls. Most functions are self explanatory. To actually adjust the data simply click on a field and the relevant window will open (in the same way as the List window).

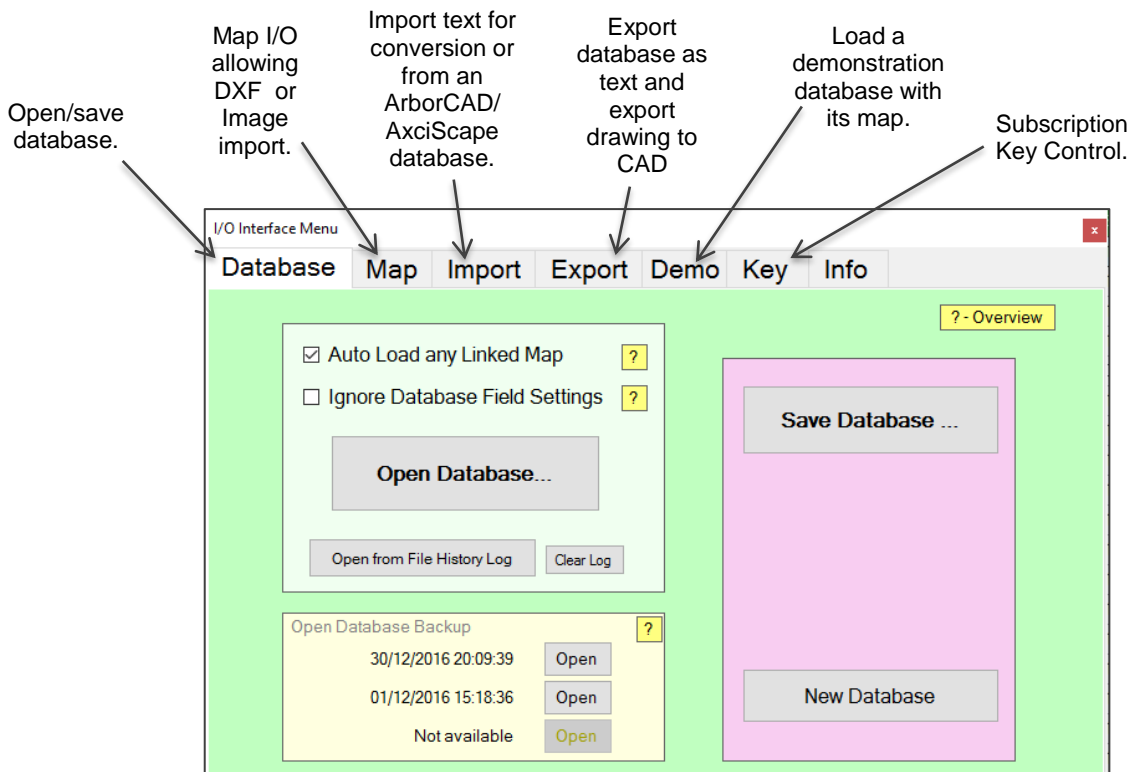


The field settings can be adjusted here (see Field Settings section).

The map position can be manually adjusted or cleared here.

The I/O Interface

Clicking on the I/O button (located at the top left corner of the ArborShadow window) opens the main Input/Output menu window.



Open/save database.

Map I/O allowing DXF or Image import.

Import text for conversion or from an ArborCAD/AxciScape database.

Export database as text and export drawing to CAD

Load a demonstration database with its map.

Subscription Key Control.

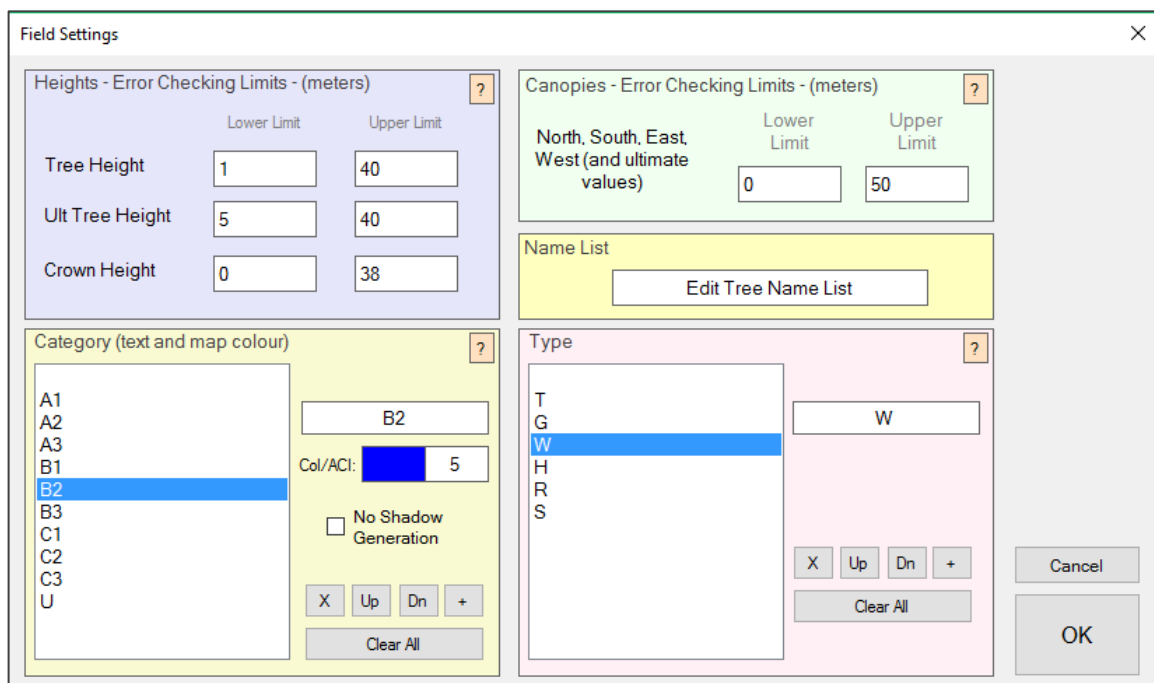
Open Database Backup	Open
30/12/2016 20:09:39	Open
01/12/2016 15:18:36	Open
Not available	Open

Field Settings

Fields which hold values such as heights and canopy spreads can be set to return an error should the data be out of range. This is helpful in spotting errors in data. Set the ranges as required.

The category and type fields can be modified to hold any data you require. They function as a drop down menu from the List and Edit windows. And the name list can be modified if required.

The category field has an added function allowing a colour to be designated for each of its items. Additionally, an item can be set to show no shadow (useful if you wish to hide shadows for BS5837 category U trees). To activate the colours you need to open the Map Settings Window (see section later).



The 'Field Settings' dialog box is divided into four main sections:

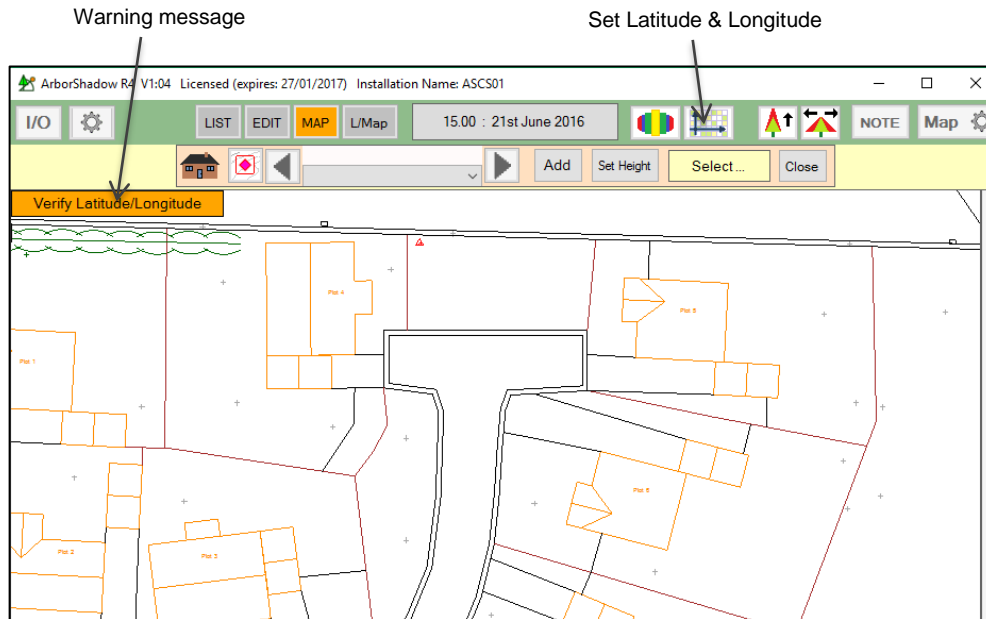
- Heights - Error Checking Limits - (meters)**: Contains three rows of input fields. The first row is for 'Tree Height' with a lower limit of 1 and an upper limit of 40. The second row is for 'Ult Tree Height' with a lower limit of 5 and an upper limit of 40. The third row is for 'Crown Height' with a lower limit of 0 and an upper limit of 38.
- Canopies - Error Checking Limits - (meters)**: Contains two input fields for 'North, South, East, West (and ultimate values)'. The lower limit is 0 and the upper limit is 50.
- Category (text and map colour)**: Features a list of categories (A1, A2, A3, B1, B2, B3, C1, C2, C3, U) on the left. On the right, there is a text input field containing 'B2', a 'Col/ACI' field with a color swatch and the value '5', a 'No Shadow Generation' checkbox, and a set of navigation buttons (X, Up, Dn, +) and a 'Clear All' button.
- Type**: Features a list of types (T, G, W, H, R, S) on the left. On the right, there is a text input field containing 'W', a set of navigation buttons (X, Up, Dn, +), a 'Clear All' button, and 'Cancel' and 'OK' buttons at the bottom right.

Field settings are automatically saved with the database file and can be saved separately as a settings file which is loaded on program startup.

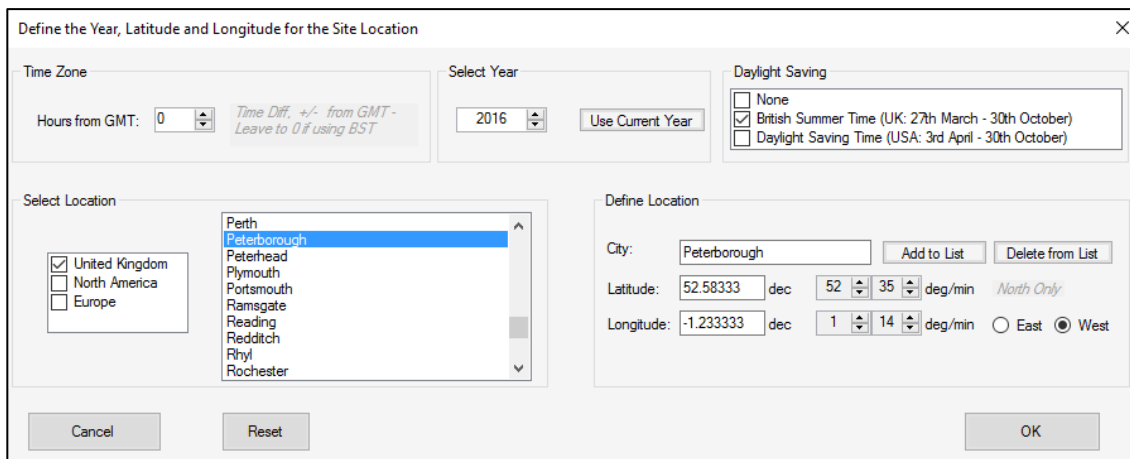
Latitude/Longitude

It is essential that the latitude and longitude position for the location of the map is determined. It is not necessary to be overly accurate; the nearest town/city will suffice!

Upon starting a new database a warning box will appear alerting you to the need for setting the location position (see below). Simply click the lat/long icon to enter its window.

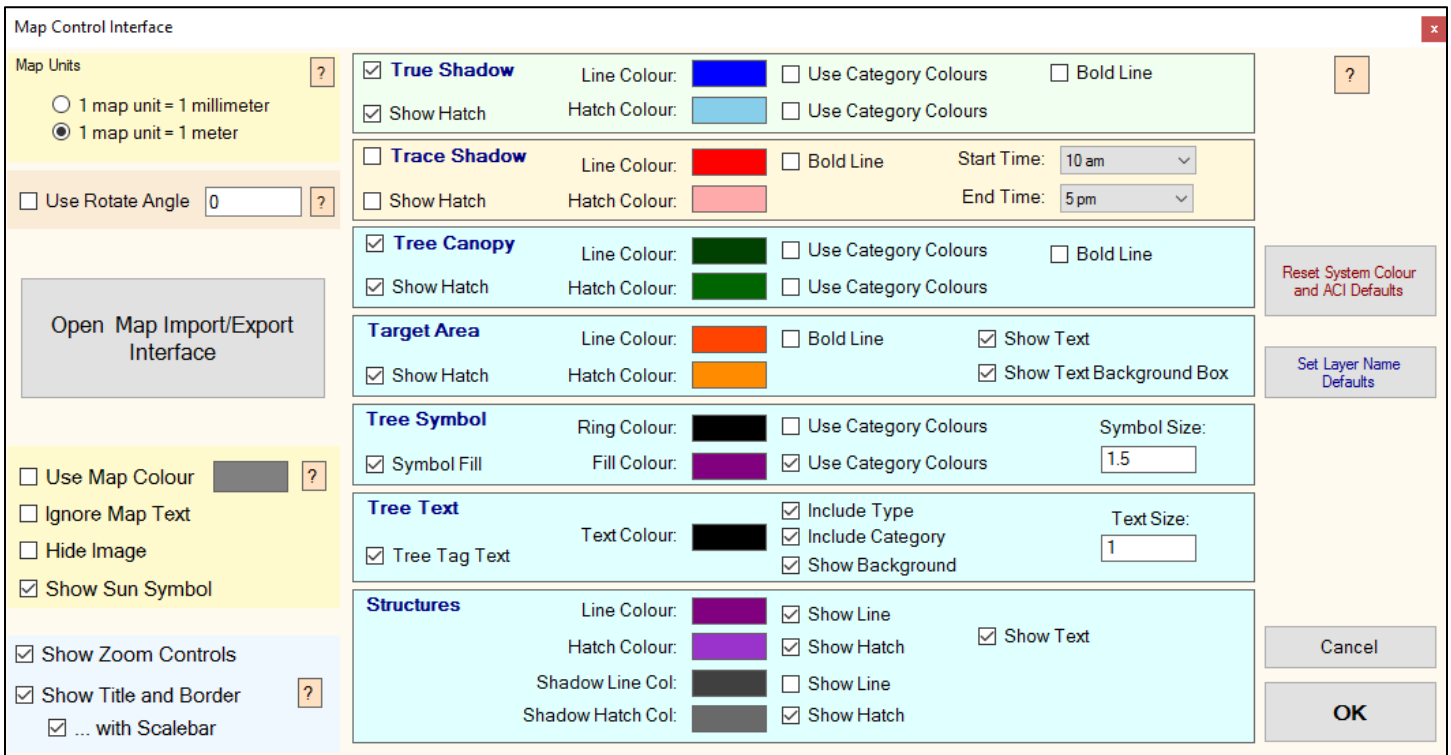


The Latitude/Longitude window can be easily set for the UK by simply selecting a place from the menu, setting the year and ensure BST is activated. You can enter your own latitude/longitude values manually.



Map Settings

These are accessed from the cog wheel icon on the top right of the ArborShadow window. Most functions are self-explanatory. Use the rotate angle to adjust the canopies and shadows in alignment with north (should north not be at the 12 o'clock position on the map).



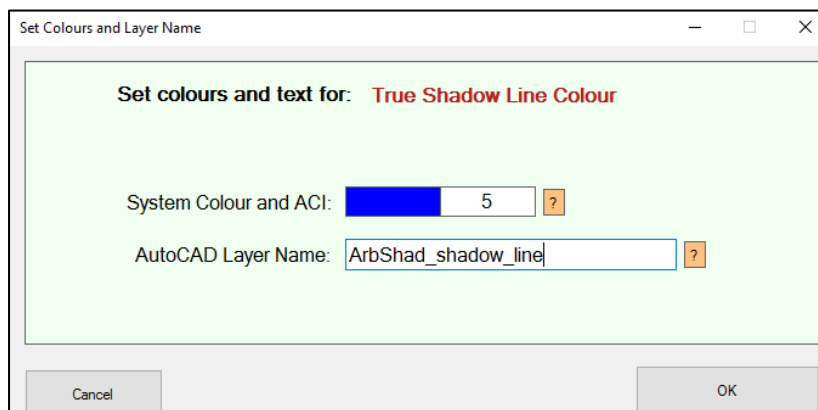
The screenshot shows the 'Map Control Interface' dialog box with the following settings:

- Map Units:** 1 map unit = 1 meter (selected).
- Use Rotate Angle:** 0.
- Open Map Import/Export Interface:** Button.
- Use Map Colour:** Disabled.
- Ignore Map Text:** Disabled.
- Hide Image:** Disabled.
- Show Sun Symbol:** Enabled.
- Show Zoom Controls:** Enabled.
- Show Title and Border:** Enabled, with Scalebar.
- True Shadow:** Line Colour: Blue, Hatch Colour: Light Blue, Use Category Colours: Disabled, Bold Line: Disabled.
- Show Hatch:** Enabled.
- Trace Shadow:** Line Colour: Red, Hatch Colour: Pink, Bold Line: Disabled, Start Time: 10 am, End Time: 5 pm.
- Show Hatch:** Disabled.
- Tree Canopy:** Line Colour: Green, Hatch Colour: Green, Use Category Colours: Disabled, Bold Line: Disabled.
- Show Hatch:** Enabled.
- Target Area:** Line Colour: Orange, Hatch Colour: Orange, Bold Line: Disabled, Show Text: Enabled, Show Text Background Box: Enabled.
- Show Hatch:** Enabled.
- Tree Symbol:** Ring Colour: Black, Fill Colour: Purple, Use Category Colours: Disabled, Symbol Size: 1.5.
- Symbol Fill:** Enabled.
- Use Category Colours:** Enabled.
- Tree Text:** Text Colour: Black, Include Type: Enabled, Include Category: Enabled, Show Background: Enabled, Text Size: 1.
- Tree Tag Text:** Enabled.
- Structures:** Line Colour: Purple, Hatch Colour: Purple, Shadow Line Col: Black, Shadow Hatch Col: Black, Show Line: Enabled, Show Hatch: Enabled, Show Text: Enabled.

Buttons on the right: Reset System Colour and ACI Defaults, Set Layer Name Defaults, Cancel, OK.

Clicking on a coloured block opens the following window where the CAD layer name, the system colour and its ACI (Autocad colour index) value can be adjusted. The layer name is used when exporting graphics to AutoCAD. The system colour is the colour used on the ArborShadow map screen. The ACI value is AutoCAD's colour code (again only used when exporting to CAD).

To change the colour and ACI value simply click on the coloured block and a selector window appears.



The screenshot shows the 'Set Colours and Layer Name' dialog box for 'True Shadow Line Colour'.

System Colour and ACI: [Blue color swatch] 5

AutoCAD Layer Name: ArbShad_shadow_line

Buttons: Cancel, OK