



Training Program: Introduction to MapAble®

Version 2: April 2017

The information and instructions described below is subject to change and you should view our online manual that is periodically updated (www.mapable.co.za/help).

Purpose of the module

The purpose of this document is to provide a general introduction and practical overview of MapAble. This program will capacitate you with all the basic MapAble functionalities, including a general MapAble overview, Workspace orientation, how to load layers into your workspace, basic visualisation and printing or downloading from your workspace.

Learning Objectives

After completing this module, you will achieve the following leaning objectives:

- GIS basics including GIS files and how they work.
- Overview of what is MapAble.
- MapAble workspace overview.
- How to download information from your workspace.
- Introduction into - How to visualise your data in MapAble (Visualisation overview).
- Introduction into How to use the drawing tools in your workspace (Drawing tools overview).

Content

What is GIS?.....	2
GIS Data.....	2
Raster data.....	2
Raster data are stored as a grid of values.....	2
Vector data.....	3
Point features.....	3
Polyline features	3
Polygon features	3
Attribute data.....	4
Types of files used in GIS software.....	4
What is MapAble®?.....	5
MapAble® website and resources.....	5
Logging in to your MapAble Workspace.....	6
MapAble functional overview®?.....	8
The view pane.....	8
Table Mode.....	27
Info Mode.....	29
MapAble® Info mode.....	29
Annexure 1: Visualise a layer/your data.....	31
Main layer input fields.....	32
Thematic Visualisation.....	35
Annexure 2: Drawing Tools.....	44

What is GIS?

A geographic information system (GIS) is a computer system which is used for capturing, storing, checking, and displaying data related to a location on the Earth's surface. A GIS can show many kinds of data on one map, this enables people to easily see, analyse, and understand patterns and relationships. With GIS technology, people can compare the locations of different things to discover how they relate to each other.

GIS can use any information that includes location. The location can be expressed in many ways, such as latitude and longitude, address, or postal code. Many different types of information can be compared using GIS. The system can include data about people, such as population, income, or education level. It can include information about the land, such as the location of streams, different kinds of vegetation, and different kinds of soil. Alternatively, it can tell use information about the sites of factories, farms, and schools, or storm drains, roads, and electric power lines¹.

GIS Data

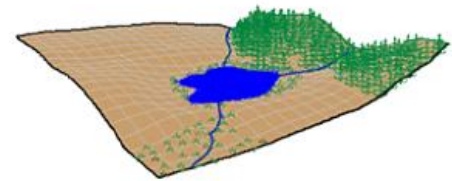
Data is another word for information. The information used in a GIS normally has a geographical aspect to it. A common feature of GIS is that they allow you to associate information (non-geographical data—i.e. the name of a feature) with places (geographical data—i.e. the location of the feature). A GIS application can store many pieces of information which are associated with each place —something that paper maps are not very good at.

Types of data

Geographic data can be divided into two types of spatial data to represent the real world. These being Raster and Vector data.

In this example, the *Real World*, our landscape, consists of:

- Rolling hills
- Grassland
- Lake
- Rivers
- Forest stands
- Marsh



It can be represented as a series of raster layers and/or vector layers.

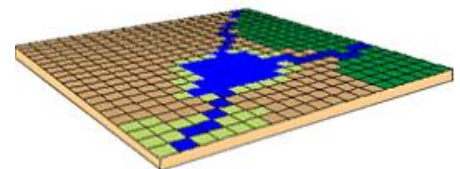
Raster data

In the raster data model, land cover is represented as:

- Single square cells

Each cell will have a value corresponding to its land cover type. Raster data are good at:

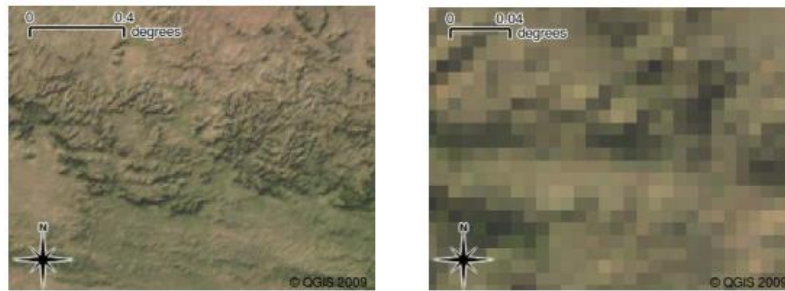
- Representing continuous data (e.g., slope, elevation, chemical concentrations)
- Representing multiple feature types (e.g., points, lines, and polygons) as single feature types (cells)
- Rapid computations ("map algebra") in which raster layers are treated as elements in mathematical expressions
- Analysis of multi-layer or multivariate data (e.g., satellite image processing and analysis)
- Hogging disk space



Raster data are stored as a grid of values.

Raster data are stored as a grid of values, like an image. For example, there are many satellites circling the earth and the photographs they take are a kind of raster data that can be viewed in a GIS. One important difference between raster and vector data is that if you zoom in too much on a raster image, it will start to appear 'blocky'. In fact, these blocks are the individual cells of the data grid that makes up the raster image

¹ <http://www.nationalgeographic.org/encyclopedia/geographic-information-system-gis/>



Vector data

In the vector data model, features on the earth are represented as:

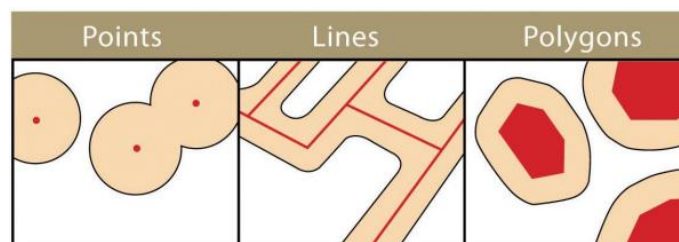
- Points
- Lines / routes
- Polygons / regions

Vector data are good at

- Accurately representing true shape and size
- Representing non-continuous data (e.g., rivers, political boundaries, road lines, mountain peaks)
- Creating aesthetically pleasing maps



Conserving disk space Vector data is stored as a series of X, Y coordinate pairs inside the computer's memory. Vector data is used to represent points, lines and areas. The illustration below shows different types of vector data.



Point features

The first thing we need to realise when talking about point features is that what we describe as a point in GIS is a matter of opinion, and often dependent on scale. Let's look at cities for example. If you have a small-scale map (which covers a large area), it may make sense to represent a city using a point feature. However, as you zoom in to the map, moving towards a larger scale, it makes more sense to show the city limits as a polygon.

When you choose to use points to represent a feature is mostly a matter of scale (how far away are you from the feature), convenience (it takes less time and effort to create point features than polygon features), and the type of feature (some things like telephone poles just don't make sense to be stored as polygons).

A point feature has an X, Y and optionally, Z value. The X and Y values will depend on the Coordinate Reference System (CRS) being used. Since we know the earth is not flat, it is often useful to add a Z value to a point feature. This describes how high above sea level you are.

Polyline features

Where a point feature is a single vertex, a polyline has two or more vertices. The polyline is a continuous path drawn through each vertex. When two vertices are joined, a line is created. When more than two are joined, they form a 'line of lines', or polyline. A polyline is used to show the geometry of linear features such as roads, rivers, contours, footpaths, flight paths and so on. Sometimes we have special rules for polylines in addition to their basic geometry. For example, contour lines, may touch (e.g. at a cliff face) but should never cross over each other. Similarly, polylines used to store a road network should be connected at intersections

Polygon features

Polygon features are enclosed areas like dams, islands, country boundaries and so on. Like polyline features, polygons are created from a series of vertices that relate to a continuous line. However, because a polygon always describes an enclosed area, the first and last

vertices should always be at the same place. Polygons often have shared geometry — boundaries that are in common with a neighbouring polygon.

As with points and polylines, polygons have attributes. The attributes describe each polygon. For example, a dam may have attributes for depth and water quality.

Attribute data

Attributes for a vector feature are stored in a table. A table is like a spreadsheet. Each column in the table is called a field. Each row in the table is a record (and represents the attribute data for a **single feature in that layer**). The figure below shows an example of how an attribute table looks in a GIS. The records in the attribute table in a GIS each correspond to one feature. Usually the information in the attribute table is stored in a database. The GIS application links the attribute records with the feature geometry so that you can find records in the table by selecting features on the map, and find features on the map by selecting features in the table.

Each field in the attribute table contains a specific type of data — **text, numeric or date**. Deciding what attributes to use for a feature requires some thought and planning.

Create Field Reload table Export to Shape file								
ID	OBJECTID	SAL_CODE	SAL_CODE_S	SP_CODE	SP_CODE_ST	SP_NAME	MP_CODE	MP_CODE
1	1	1600090	1600090	160001001	160001001	Kliprand SP	160001	160001
2	2	1600001	1600001	160002001	160002001	Matzikama NU	160002	160002
3	3	1600002	1600002	160002001	160002001	Matzikama NU	160002	160002
4	4	1600003	1600003	160002001	160002001	Matzikama NU	160002	160002
5	5	1600005	1600005	160002001	160002001	Matzikama NU	160002	160002
6	6	1600006	1600006	160002001	160002001	Matzikama NU	160002	160002
7	7	1600007	1600007	160002001	160002001	Matzikama NU	160002	160002
8	8	1600008	1600008	160002001	160002001	Matzikama NU	160002	160002
9	9	1600010	1600010	160002001	160002001	Matzikama NU	160002	160002
10	10	1600014	1600014	160002001	160002001	Matzikama NU	160002	160002
11	11	1600016	1600016	160002001	160002001	Matzikama NU	160002	160002

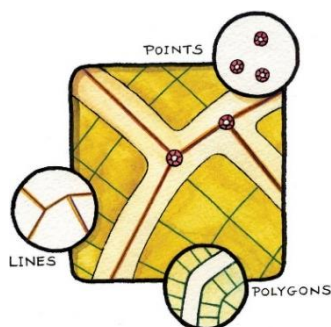
With so many options, how do we make a good choice as to what attributes are needed for a feature? It usually boils down to what you plan to do with the data. If you want to produce a colour coded map showing houses by age, it will make sense to have a 'Year Built' attribute for your feature. If you know for sure you will never use this type of map, it is better to not store the information. Collecting and storing unneeded information is a bad idea because of the cost and time required to research and capture the information. Very often we obtain vector data from companies, friends or the government. In these cases, it is usually not possible to request specific attributes and we have to make do with what we get.

Types of files used in GIS software

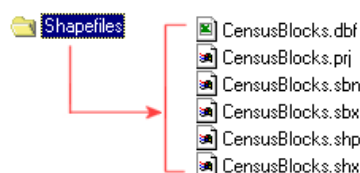
A GIS system requires various types of files that are geo-reference (includes locational information) in order to display information or maps.

ESRI Shapefile

A shapefile is a simple, nontopological format for storing the geometric location and attribute information of geographic features. Geographic features in a shapefile can be represented by points, lines, or polygons (areas). The workspace containing shapefiles may also contain dBASE tables, which can store additional attributes that can be joined to a shapefile's features².



A shapefile is a family of files that together form a shapefile:

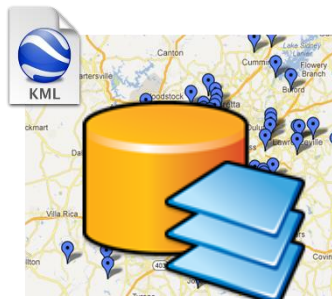


² <http://desktop.arcgis.com/en/arcmap/10.3/manage-data/shapefiles/what-is-a-shapefile.htm>

These files include the projection (.prj), database (.dbf), index file (.shx) and description of the vector (.shp). When uploading a shapefile into a GIS program such as MapAble you need all the files associated with the shapefile (See section how to load a shapefile illustrated later in this document).

Google KML/KMZ file

KML (Keyhole Markup Language) is an XML based file format used to display geographic data in an Earth browser such as Google Earth, Google Maps, and Google Maps for mobile (including MapAble). With KML, you can display pretty much everything on a map. A KML can capture points, lines, and polygons into one file where shapefiles can only accommodate one type per layer (See section how to load a KML illustrated later in this document).



Geodatabase

At its most basic level, an ArcGIS geodatabase is a collection of geographic datasets of various types held in a common file system folder such as a Microsoft Access database, or a multiuser relational DBMS (such as Oracle, Microsoft SQL Server, PostgreSQL, Informix, or IBM DB2). Geodatabases come in many sizes, have varying numbers of users and can scale from small, single-user databases built on files up to larger workgroup, department, and enterprise geodatabases accessed by many users. A Geo Data Base contains multiple files such as raster datasets, vector/feature class datasets and tables.

What is MapAble®?

MapAble® is a web-based geo-intelligence system (Web-GIS) integrating mapping, data visualisation, analysis and project collaboration at low entry level access for non-GIS specialists. MapAble® exist to simplify the complexity of information through user friendly mapping, visualisation and reporting interface. MapAble® brings cloud based GIS functionality and data together into a unique system that will satisfy the curiosity of the occasional user to the high-level needs of the professional planning teams collaborating across continents.

MapAble® website and resources

The MapAble website is used to both login to your workspace and houses various tools and resources. New developments on MapAble are posted on the Home page of the website and include various updates, news and articles related to MapAble. The website also houses the [Data Catalog](#)³ in an embedded viewer⁴ which highlights all the available data layers on MapAble. The help menu and other useful tools such as an icon set can be accessed via the Tools item. To login to your workspace click on the login item to the right-hand corner of the webpage.



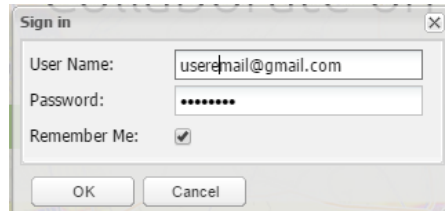
³ The MapAble® Data Catalog can be accessed at <https://goo.gl/GXDjB3>.

⁴ An embedded viewer refers to an online viewer that has limited functionality (navigation mainly) in which users can view data layers.

Logging in to your MapAble Workspace

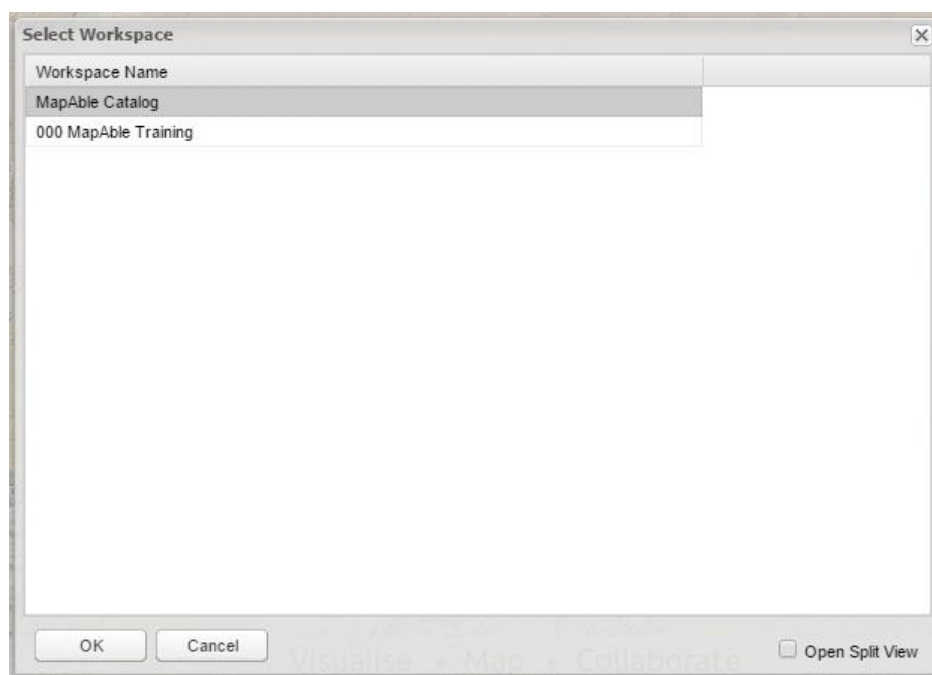
Once you clicked the login button (located on the top right of the website) a new login page will open. On the page, you will see the sign in tab on the left-hand side of the screen, click on it and it will open the sign in box. In the activation email sent to you after you registered for MapAble, you would have received a user name (which is your email address) and a password (you selected via the MapAble shop). Type these into the relevant boxes and select remember me if you are working on your personal computer.

LOGIN 



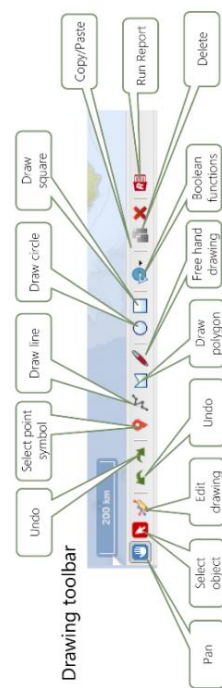
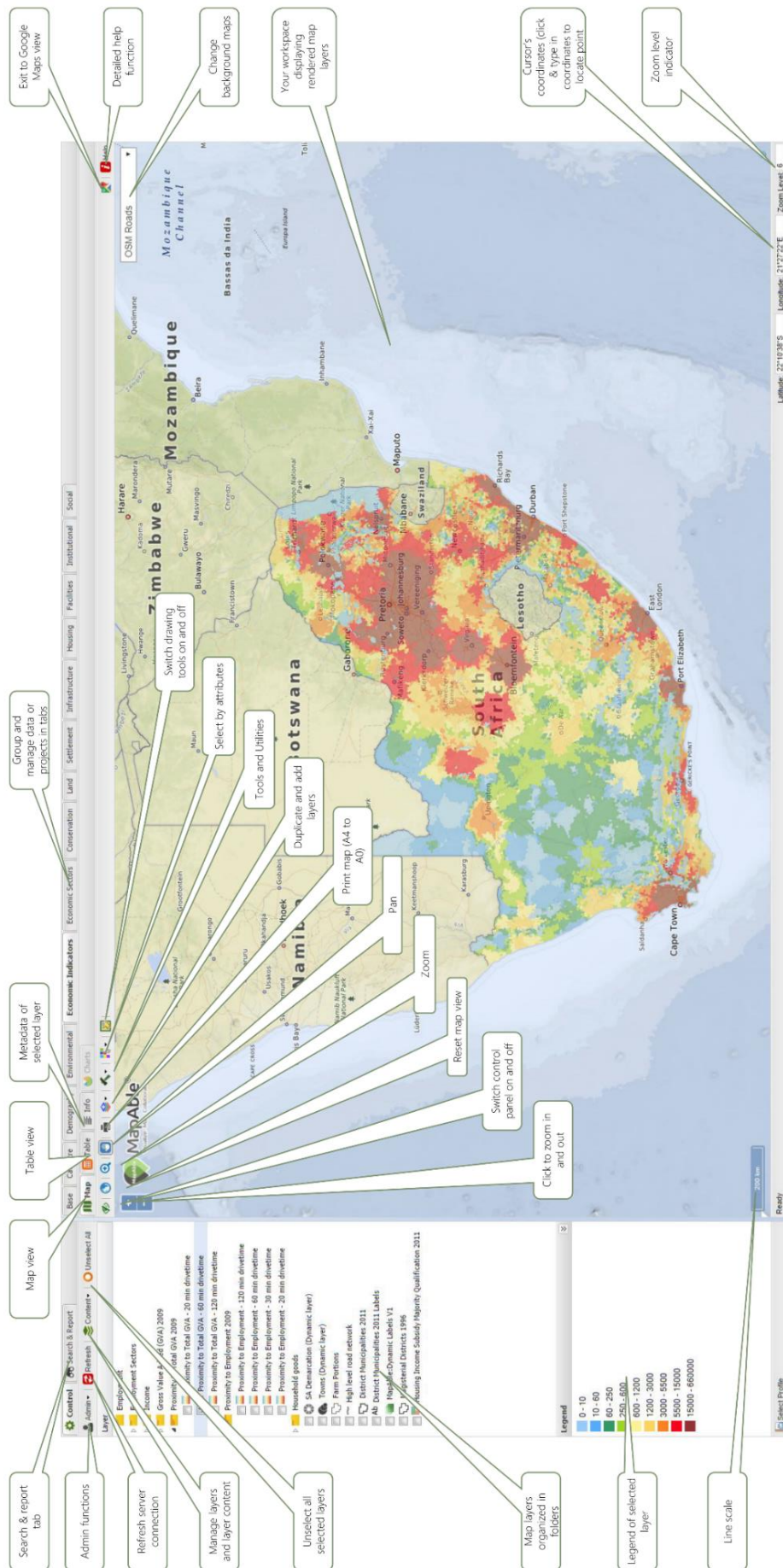
A 'Sign in' dialog box with a title bar containing a close button. It contains three input fields: 'User Name:' with the text 'user@mail@gmail.com', 'Password:' with masked characters '*****', and 'Remember Me:' with a checked checkbox. At the bottom are 'OK' and 'Cancel' buttons.

You can now choose which workspace you want to login to, either your workspace/s and the MapAble Catalog. Click on your workspace and the workspace will automatically open to your first tab with no open layers.



A 'Select Workspace' dialog box with a title bar containing a close button. It features a list box titled 'Workspace Name' with two items: 'MapAble Catalog' (highlighted) and '000 MapAble Training'. At the bottom are 'OK' and 'Cancel' buttons, and a checkbox labeled 'Open Split View'.

A quick reference guide is displayed on the next page.



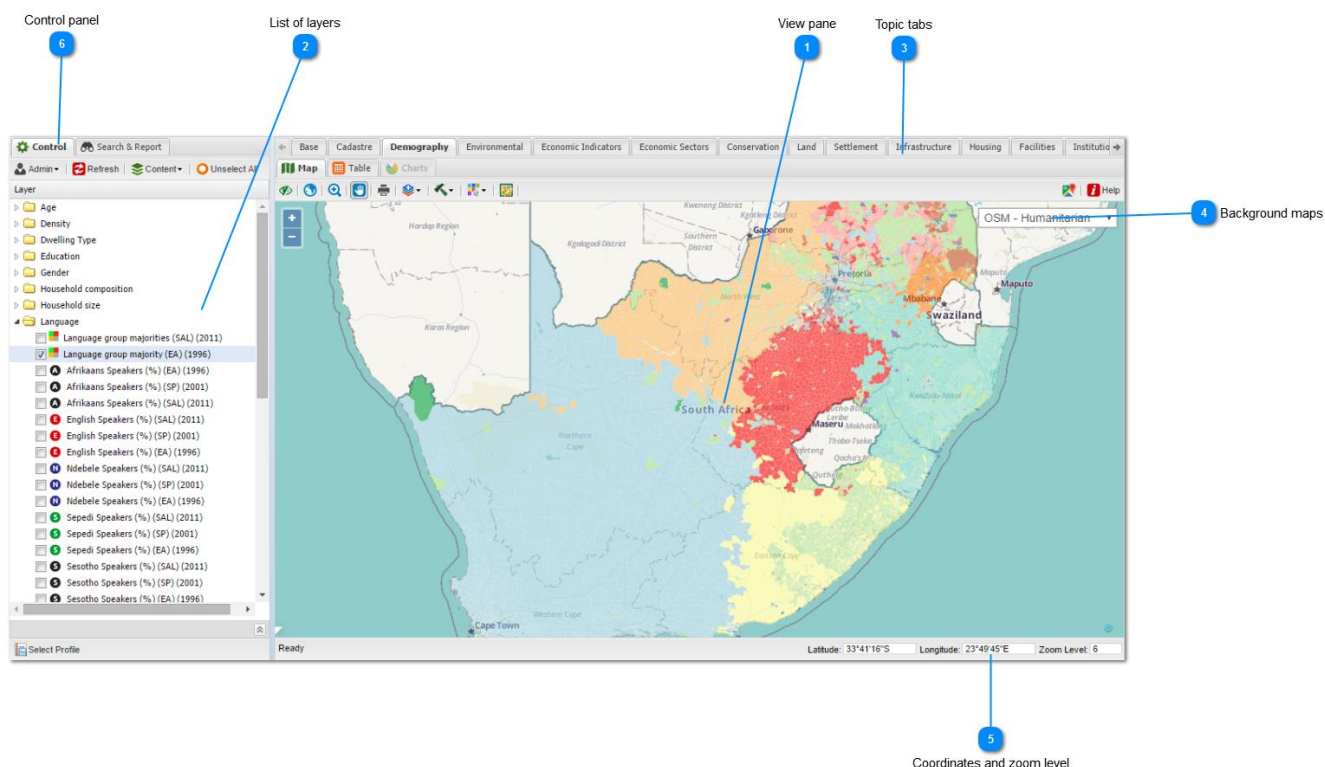
Quick reference guide



MapAble functional overview

When you open your workspace, you will see the main window with no activated map layers. The various sections or areas of the main window are as follows:

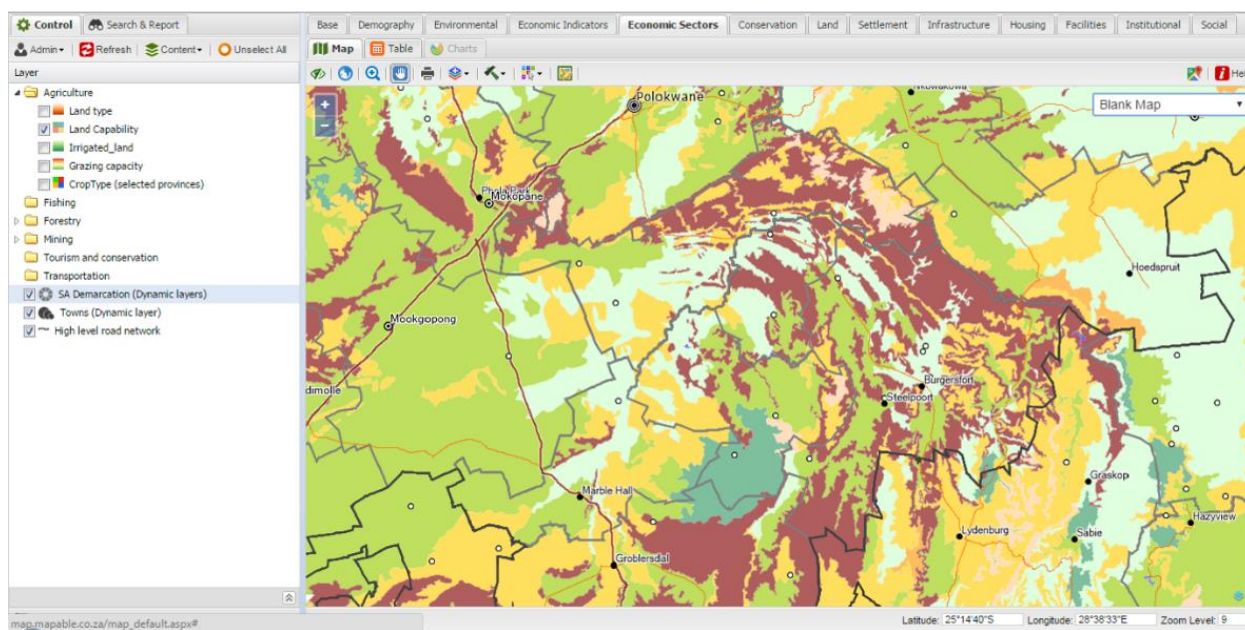
1. The View pane
2. The List of layers and Legend
3. Various Topic Tabs
4. Various Background maps
5. GPS coordinates and Zoom Levels
6. The Control panel
7. Dynamic Legend



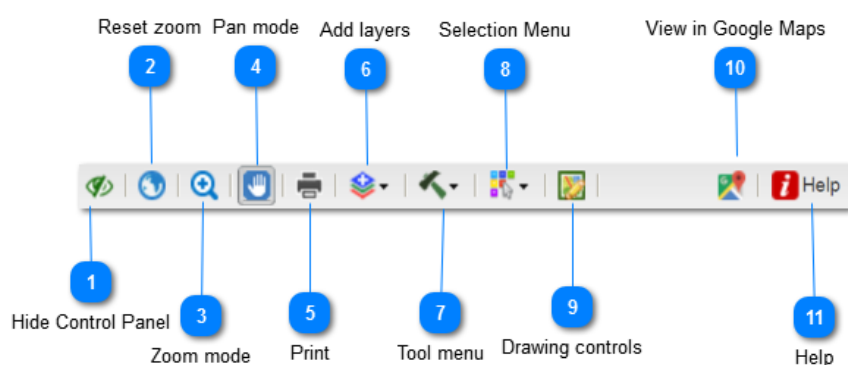
The view pane

The view pane is the main area where the maps, tables and graphs are displayed. The default view will always be the map. Apart from displaying the maps in the view pane, tables and charts related to a specific data layer in the data list can also be displayed. The map mode is the default mode in the View Pane. Once the user has selected layers in the layers list, it will be displayed in the view pane.

A typical map of a with several layers will look similar to the example shown below:



Once the desired layers are displayed in the map, users have a range of tools and functions to work with. The following menus will appear once the view pane is in the map mode:

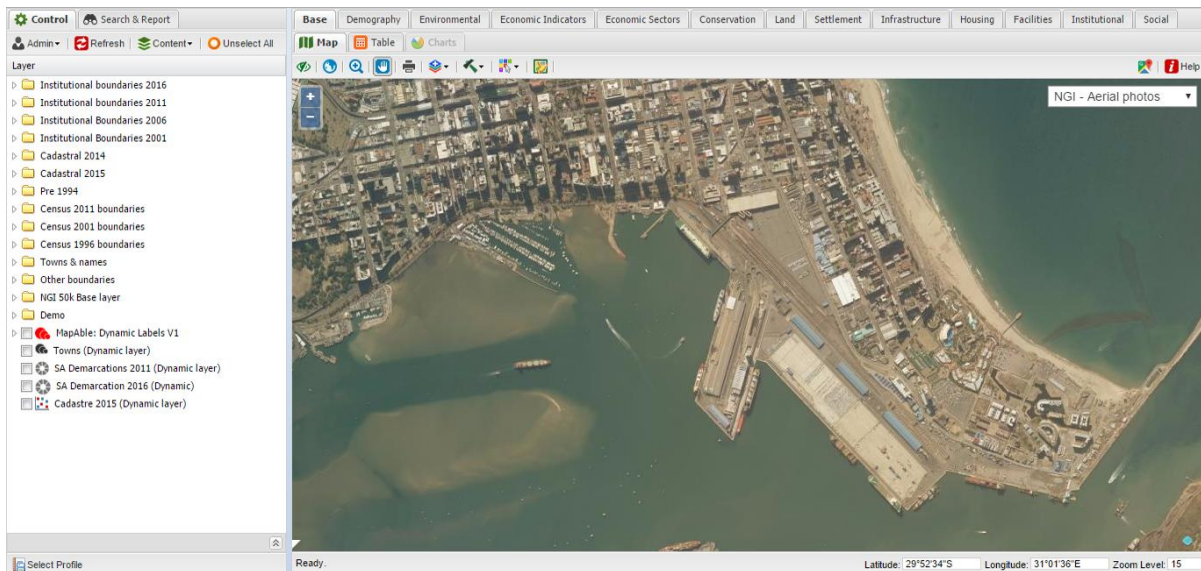


1 Hide Control Panel

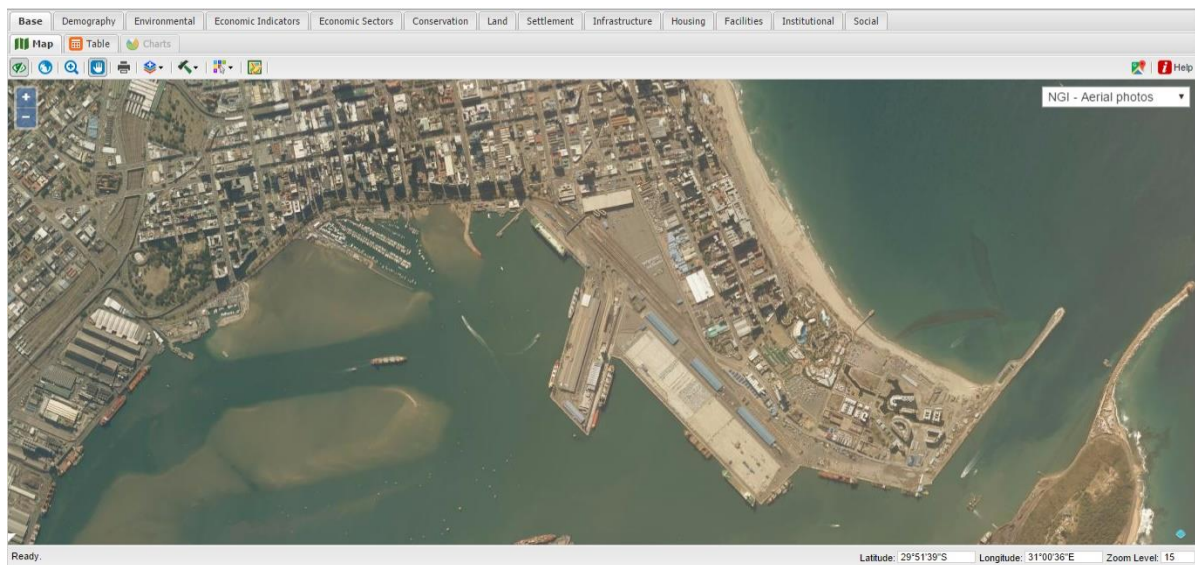
The Hide Control panel lets the user remove all the controls on the left-hand side of the view pane to increase the area of the map view pane.

The following two images illustrate the difference between a visible and removed Control panel:

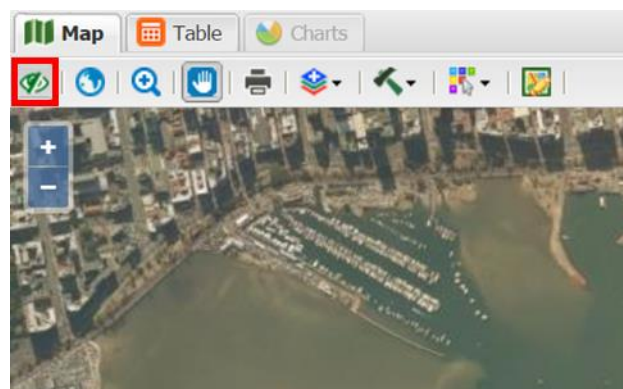
Visible control panel:



Removed control panel:



When you need to use the control panel again, select the Show Control Panel button (which replaced the Remove Control Panel button).



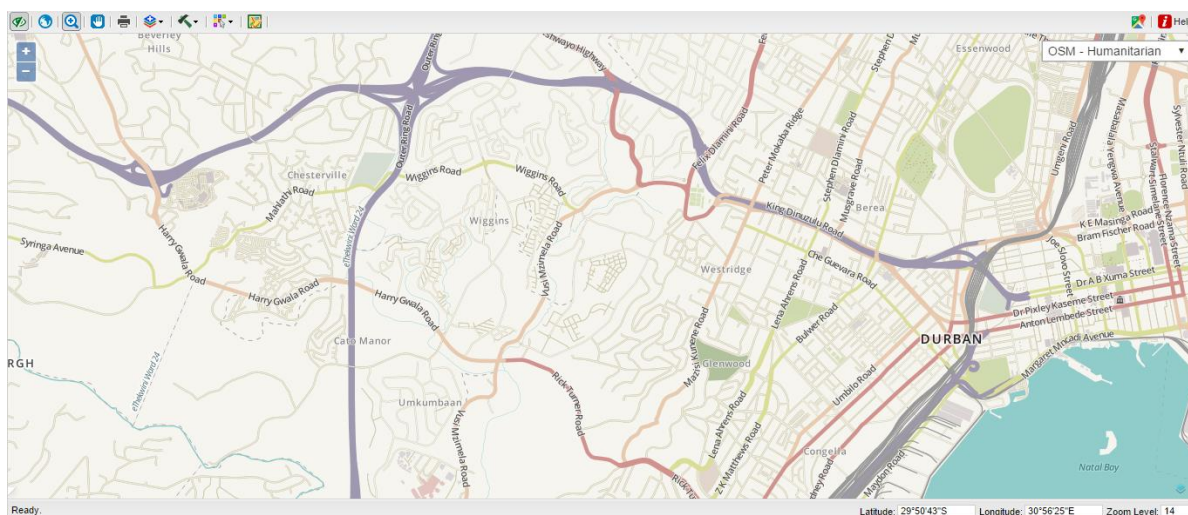
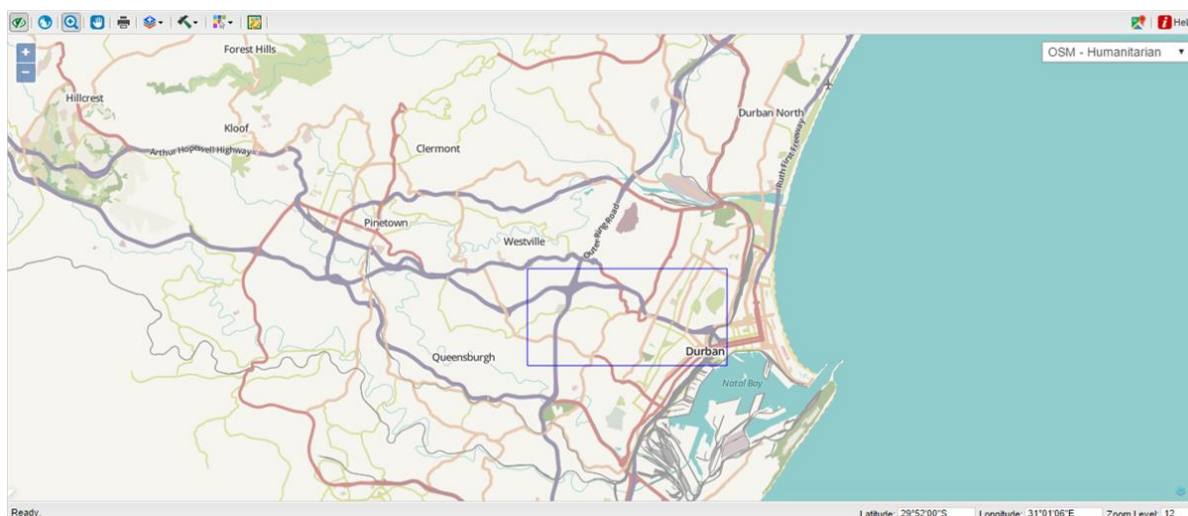
2 Reset zoom

The Reset Zoom button gives you the function to zoom back to the default View Extent of the workspace. The default View Extent is discussed under the Admin dropdown list.

3 Zoom mode

The MapAble has a set of standard navigation tools, these include the zoom-in  and zoom-out  function.

Apart from the standard zoom and navigation tools in MapAble, an additional zoom tool is available to ease the process of zooming into an area. Once the  button is selected, you can draw a rectangle over the area of the map to zoom to. The map display will move the selected area:

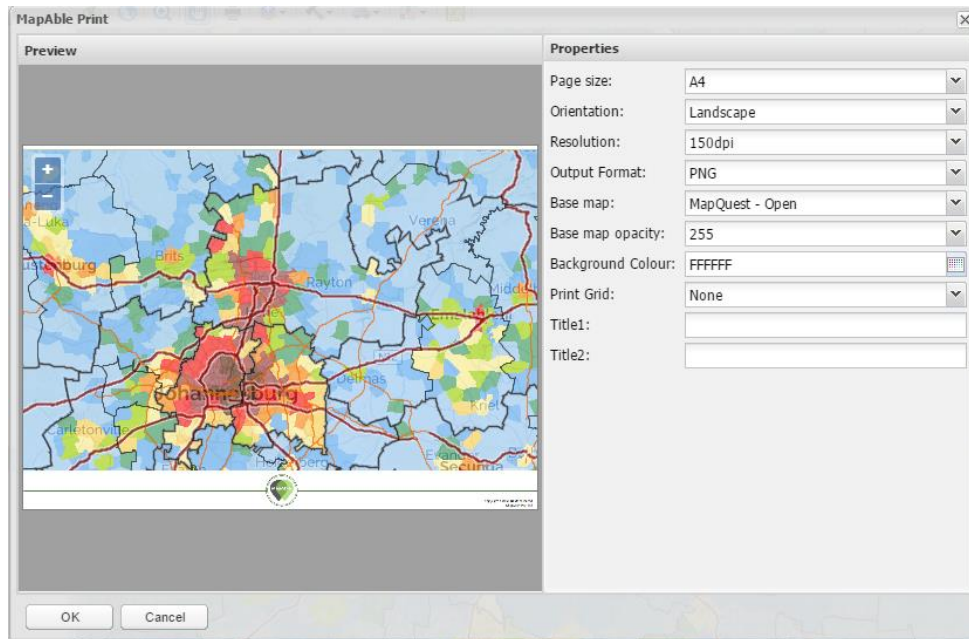


4 Pan mode

You can move the map area in any direction with the pan tool. Once the navigation is in pan mode, you can click-hold and drag the mouse anywhere in the map view and use the mouse to move the map to the desired position.



The current view in the map can be printed by clicking the Print button. Once the print button is clicked, the following dialog box appears including a print preview:



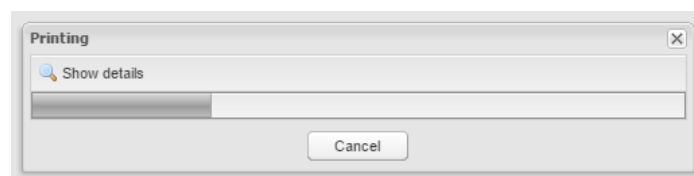
The MapAble® printbox displays a print preview screen that automatically displays the area you have selected to print. However, you can adjust the area to print by click and dragging to the desired print area (see pan mode) as well as adjusting the zoom level.

The printbox offers the following printing options:

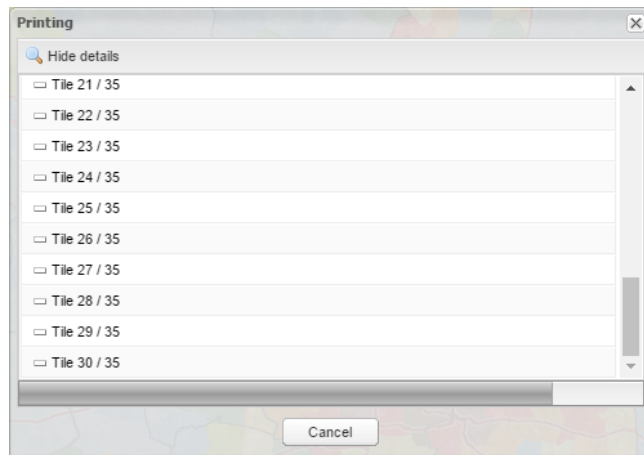
Page size	A4 to A0
Orientation	Landscape or Portrait
Resolution	75dpi, 150dpi or 300dpi
Output Format	PNG or PDF
Base map	Which base map to be displayed in the background. Other base maps can be chosen from the list.
Base map opacity	The opacity of the base map (0 = fully transparent)
Background Colour	The user can change the background colour if the Black background map is selected.
Print Zoom Level	Adjust to pre-set zoom levels (auto zoom level selected as standard)
Title 1	User can add a title to the map (Optional)
Title 2	User can add a subtitle to the map (Optional)

When the desired choices are made, you can click the OK button to activate the printing process.

The following dialog box will show the progress of the printing process:



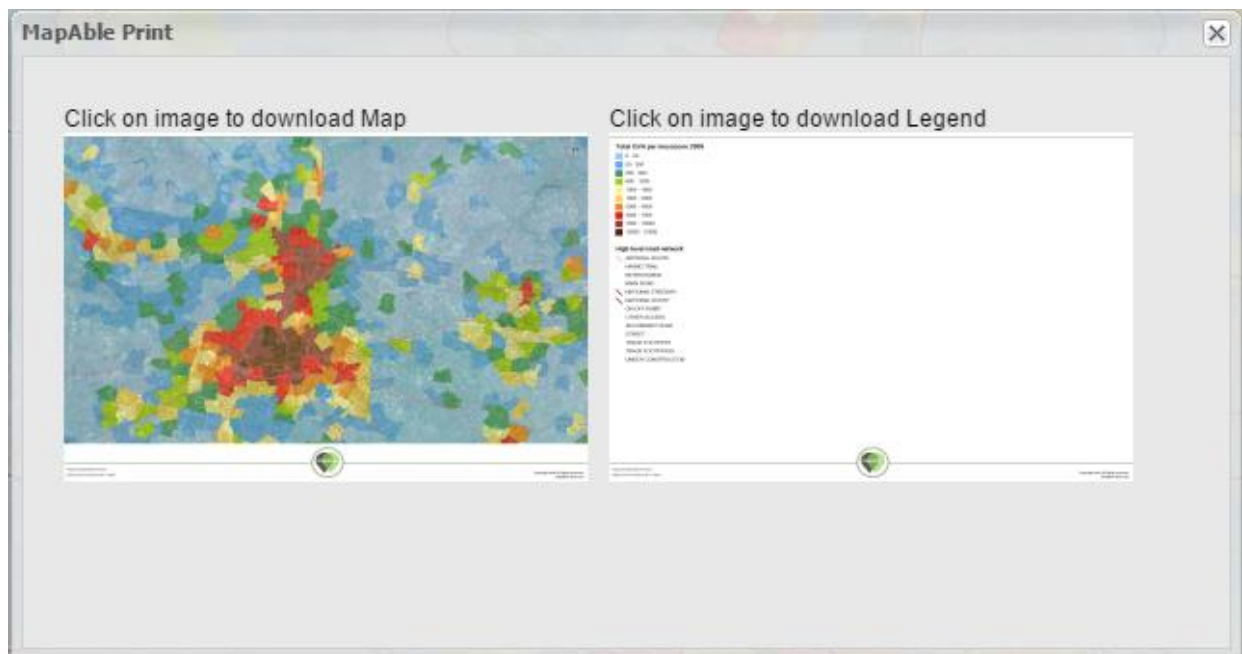
When the show details option is selected, the following can be seen:



Please note:

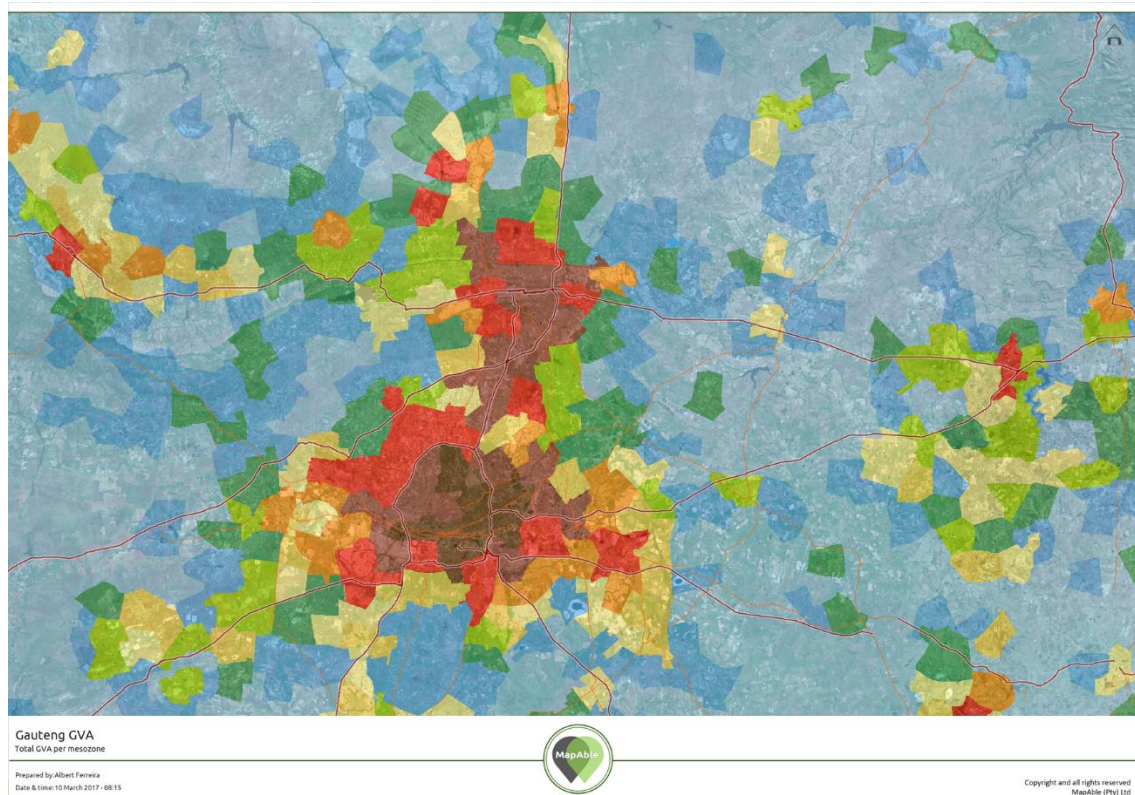
The printing all happens on the server to ensure the best map quality. The process involves the zooming in to the area to create high quality tiles. The exact zoom level as seen on the screen may not be the same size as the printed version (although you can adjust the zoom level in the print preview mode). If the user needs another zoom level, please try different level, and redo the printing until satisfied.

Once all the tiles are created on the server, it will assemble the map as well as a legend and give you the option to download with the following dialog box:



You can now download⁵ the files and print them on a printer. The final map will typically look like this next example:

⁵ Files will download to your default download folder



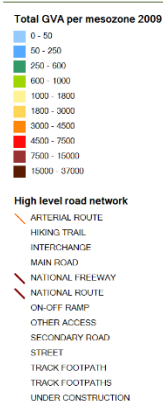
The information added to the map will look like the following example. Note that the user name and a time stamp for versioning is also added to the map.

Gauteng GVA

Total GVA per mesozone

Prepared by: Albert Ferreira
Date & time: 10 March 2017 - 08:15

The Legend is printed on a separate map and will typically look like the following example.



Prepared by: Albert Ferreira
Date & time: 10 March 2017 - 08:15

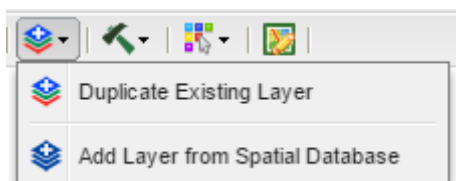
Copyright and all rights reserved
MapAblo (Pty) Ltd

Using a separate page for the legend has the following advantages:

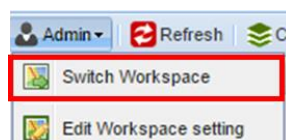
- Does not clutter the map area,
- Layers with very long legends can be added without it overriding large sections of the map,
- Users have more options when adding the maps to a document for publication,
- The legend can be edited and clipped in a graphics editor (Photoshop, PowerPoint, etc.).



This dropdown lists functions as a quick access tool to load layers into your workspace. There are two ways to add layers into your workspace; (1) to duplicate and existing layers or (2) to add a layer from the spatial database.

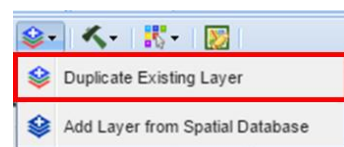


Duplicate Layers

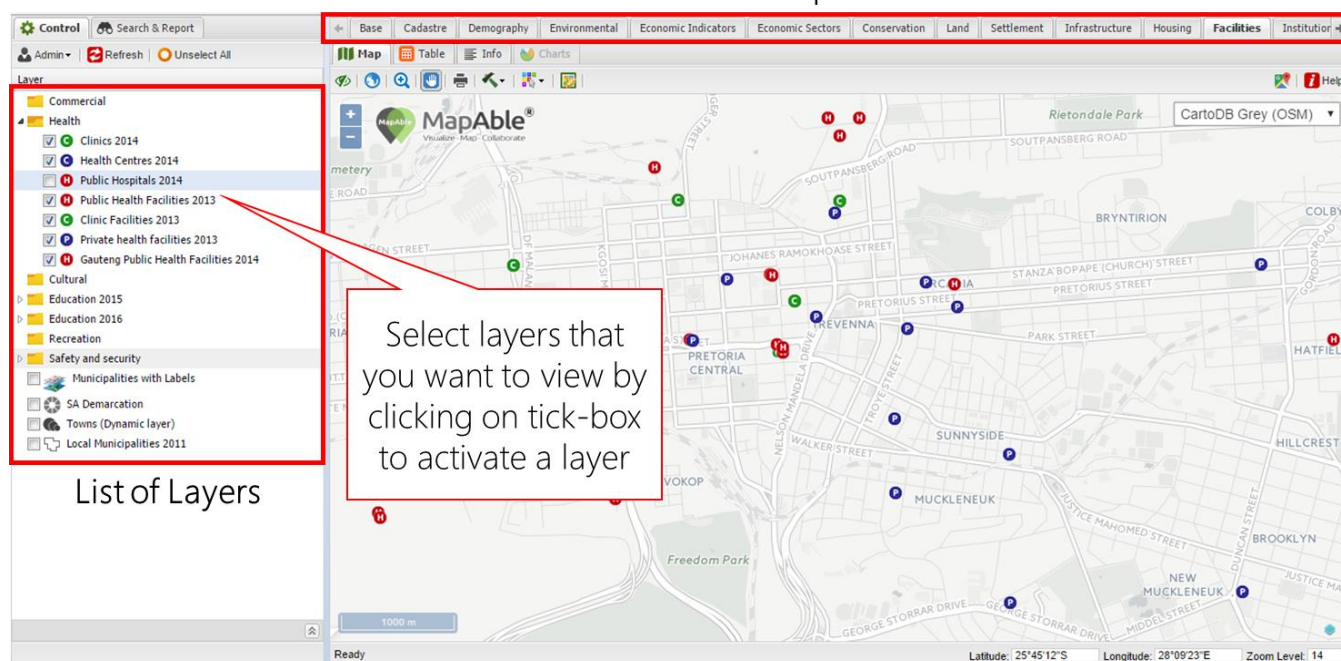


The duplicate layer function is designed to import fully rendered layers into your workspace from the 'MapAble Catalog' or to duplicate a layer from your own workspace.

To start, Switch Workspaces and select the 'MapAble Catalog'. While in the Catalog you can explore the various topic tabs and associated layers in each tab. For this example, you can explore the layers in the Catalog that are relevant to community facilities by clicking on the 'Facilities' topic tab. Once you see a layer you want, note the name and switch back to your Workspace and Duplicate the layer into your workspace.



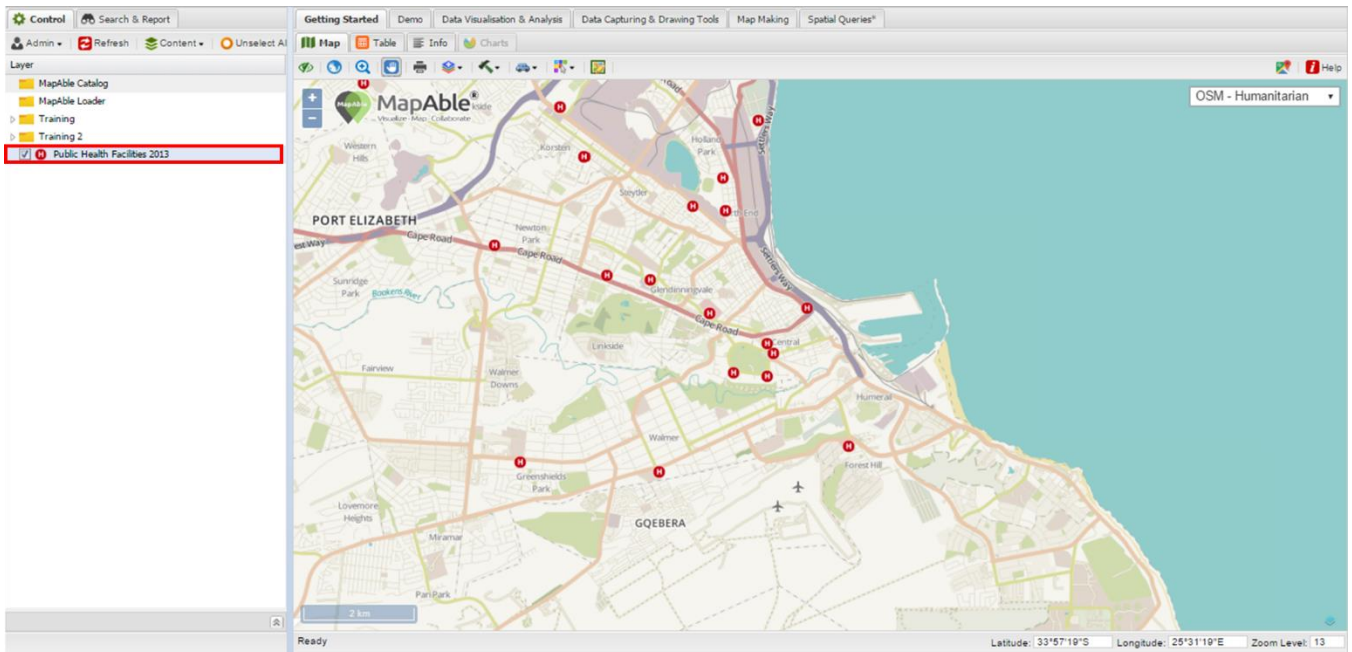
Topic Tabs



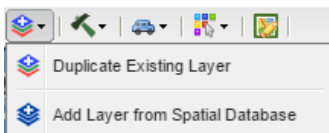


Once you have switched back to your workspace, select the 'Duplicate Existing Layer' function and the Find layer search function will open.

In the find layer box type in Public Hospitals and click on the magnifying glass. All the related fields will be listed in the box below, then double click on the Mapable/Facilities/Public Health Facilities 2013. This will load the layer into your workspace (in the current tab) where you can activate and view the layer. Once the layer is loaded you can edit the layer.

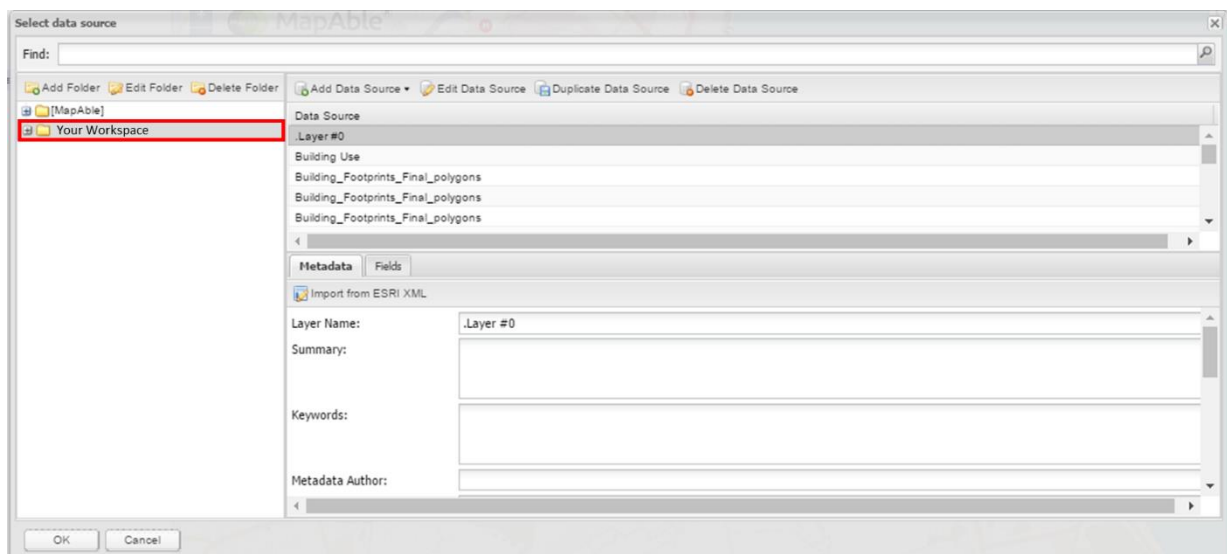


Adding your own data

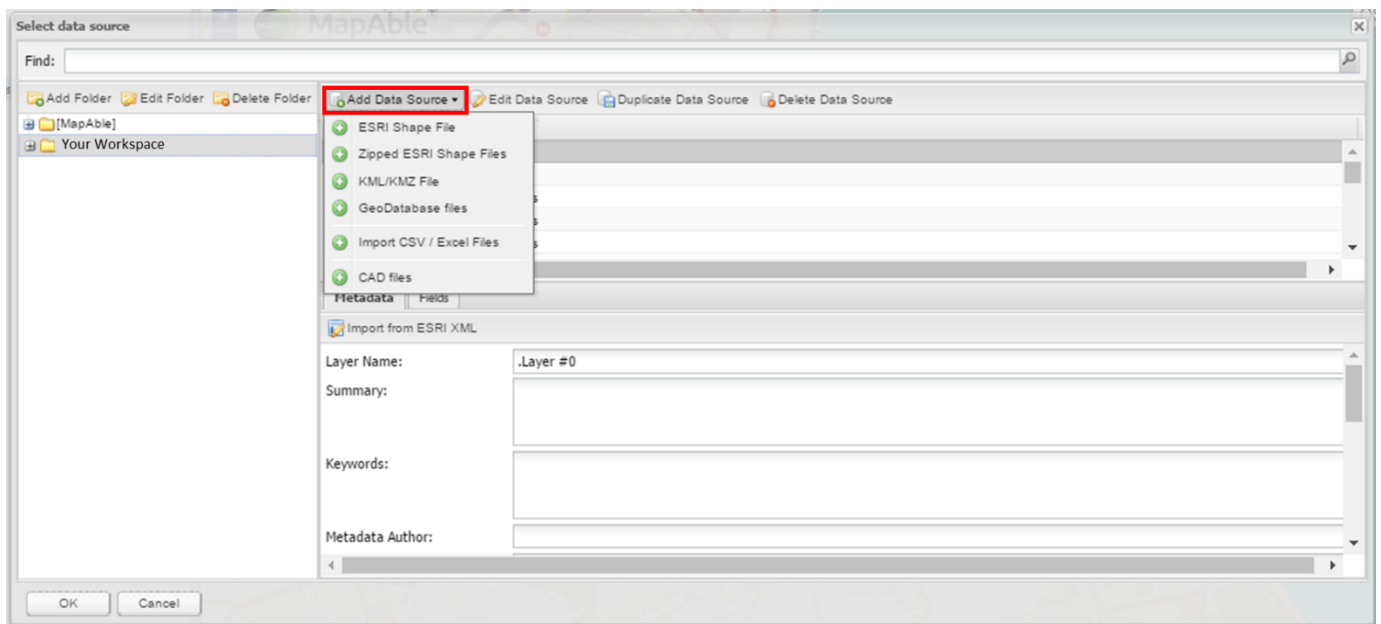


You can upload and render your own data in Mapable via the "Add Layer from Spatial Database Button" (accessed either through the content dropdown or from the shortcut button above the viewpane). The process to follow will show how to load data into Mapable and then how to render the data for the first time.

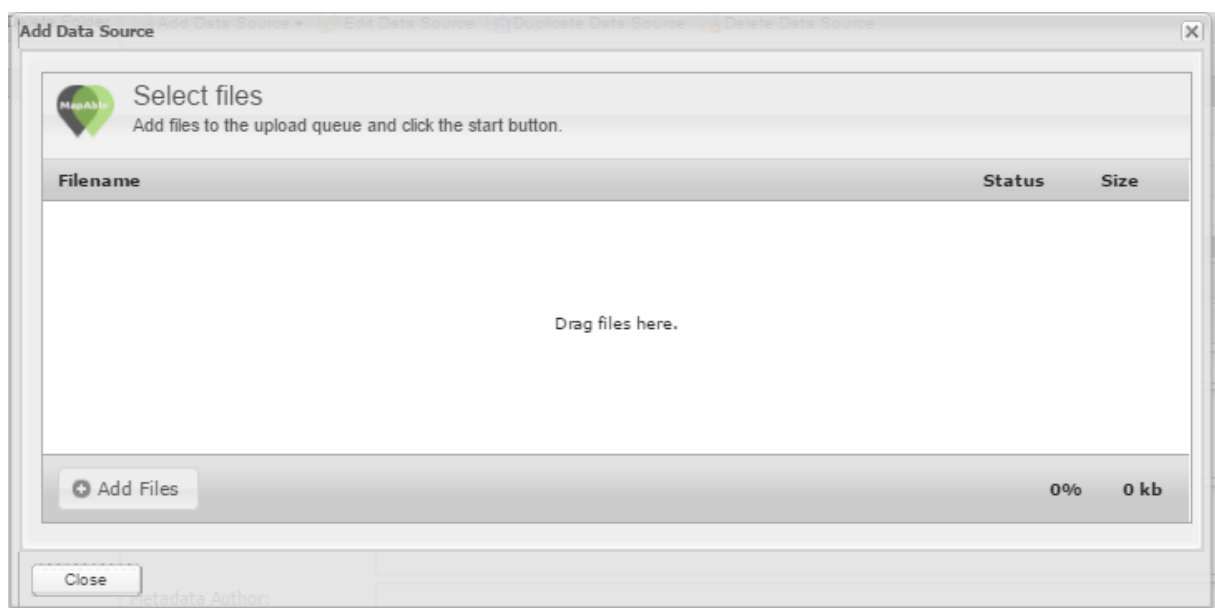
To start, select the "Add Layer from Spatial Database" button. The "Select data source" box will open, where the user can upload and/or select the data that they want to use in their own workspace. Now select your workspace (it will be at the bottom of the file structure as shown in red in the image below). This will tell the system where the files to be uploaded will be saved.



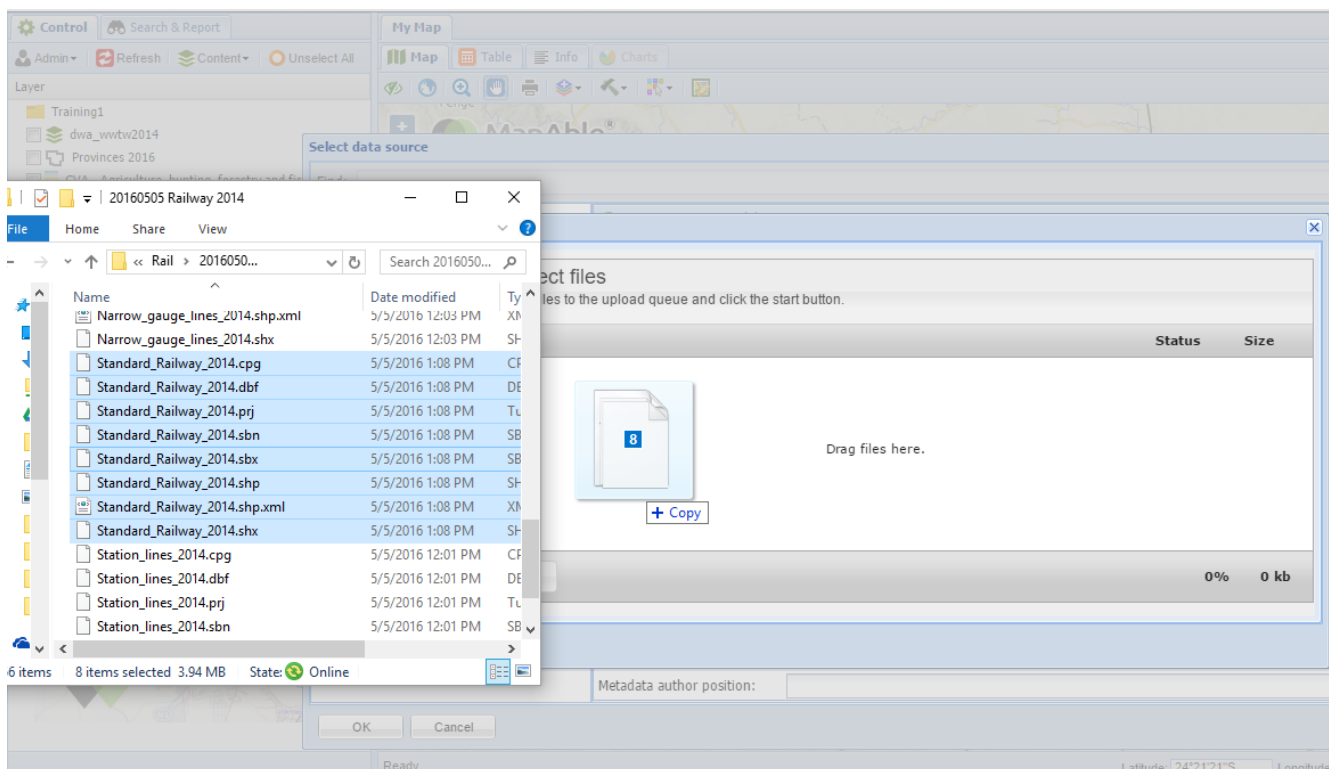
Next, click on the "Add Data Source" which opens a list of file format that can be loaded into MapAble. Select the type of file to be load into the workspace. The various files types are: ESRI Shapefiles, CSV/Excel Files, CAD files, KML/KMZ Files and GeoDatabase files.



After clicking on one of the options, the "Add Data Source" box will open.



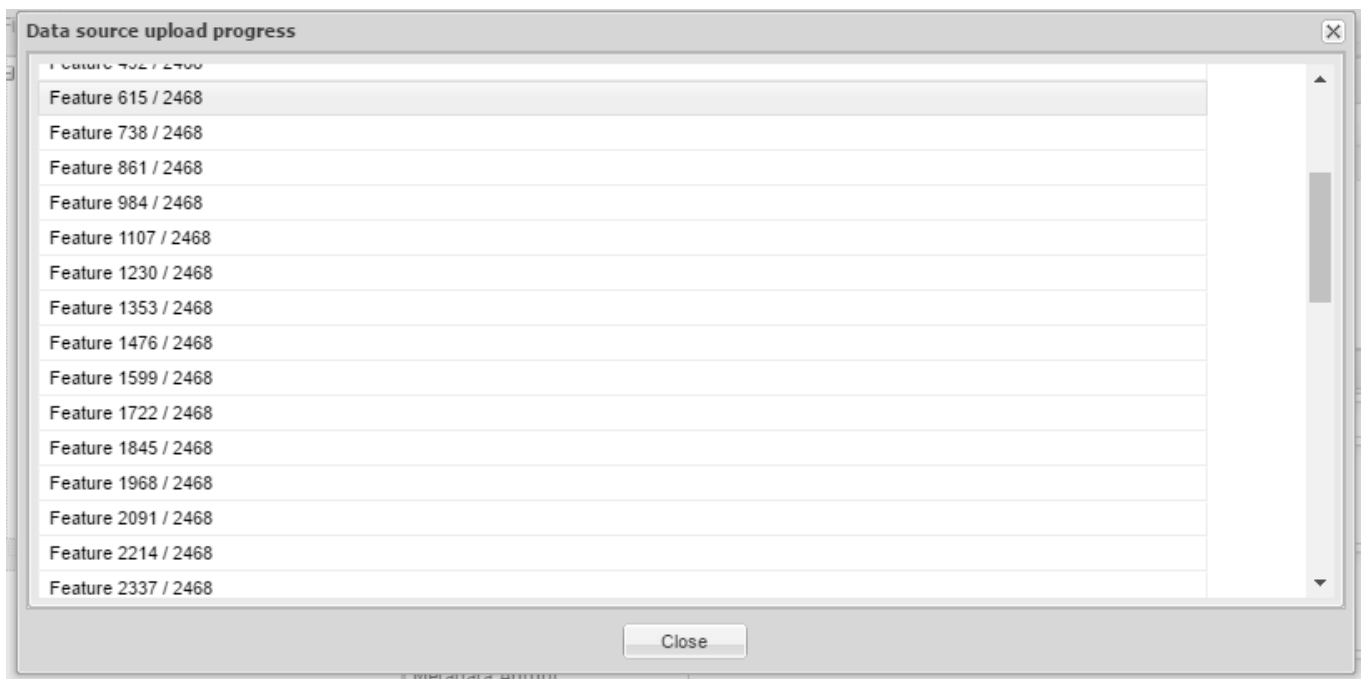
To add a Shapefile (which includes the .shp, .shx, .dbf and .prj files), KML/KMZ or GeoDatabase file (a GeoDatabase file must first be compressed/zipped to be in a .gdb.zip format), simply select and drag the files into the "Add Data Source" box.



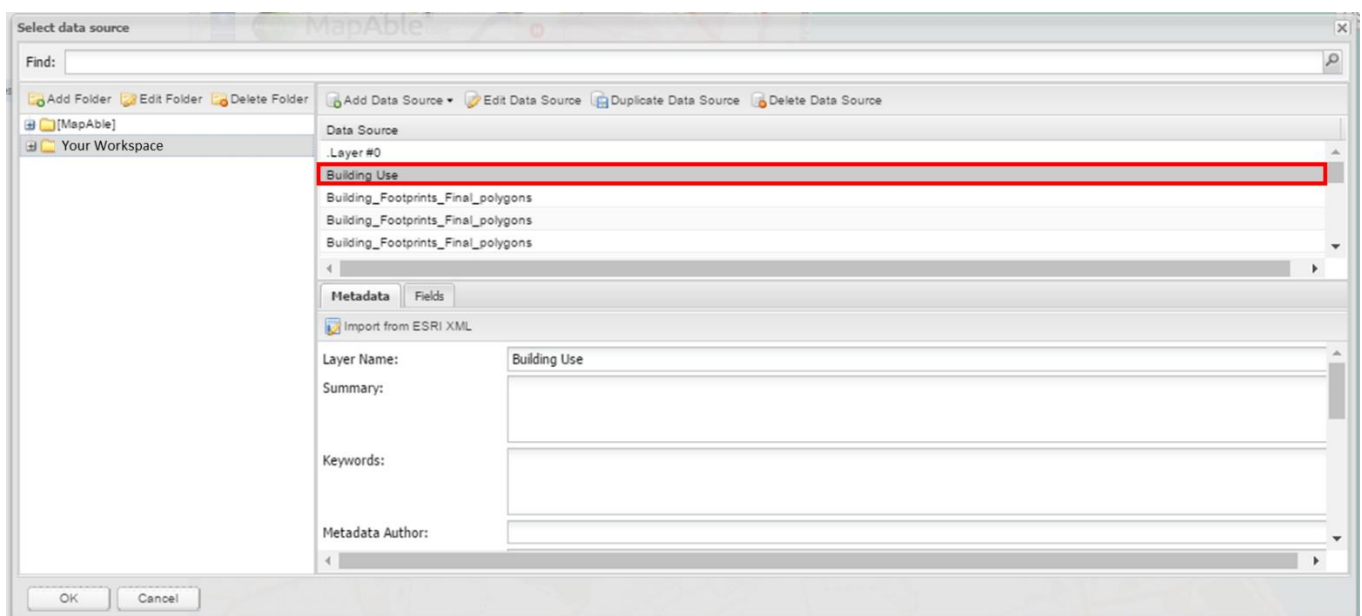
After the files have been dragged into the box, Mapable loads up the files while checking the files for errors.



Mapable displays the upload progress and indicates if any errors have been detected.



After the files, have been loaded to your database, simply select the file from within the "Select data source" box, click 'OK' and it will be added to your list of layers.



Note that layers that you load from the spatial database are not rendered or visualised. To view the data, you need to visualise the layer (select an attribute to visualise). It is also possible to add layers from the MapAble catalog into your workspace from the "Select data source" box.

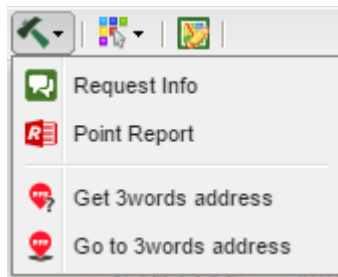


Visualising your data layers:

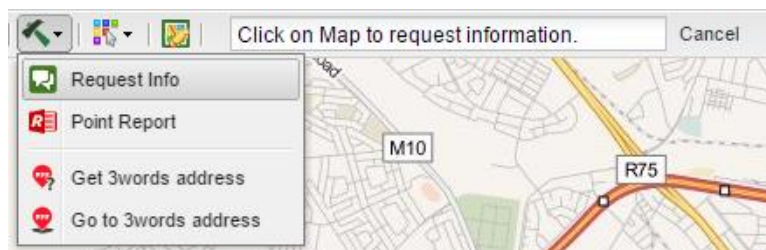
If you load a layer from the MapAble Catalog or your own spatial database, the layer is not rendered and will appear solid white (In the case of polygons) in the map mode. To visualise a layer see Annexure 1 at the end of this document.

7 Tool menu

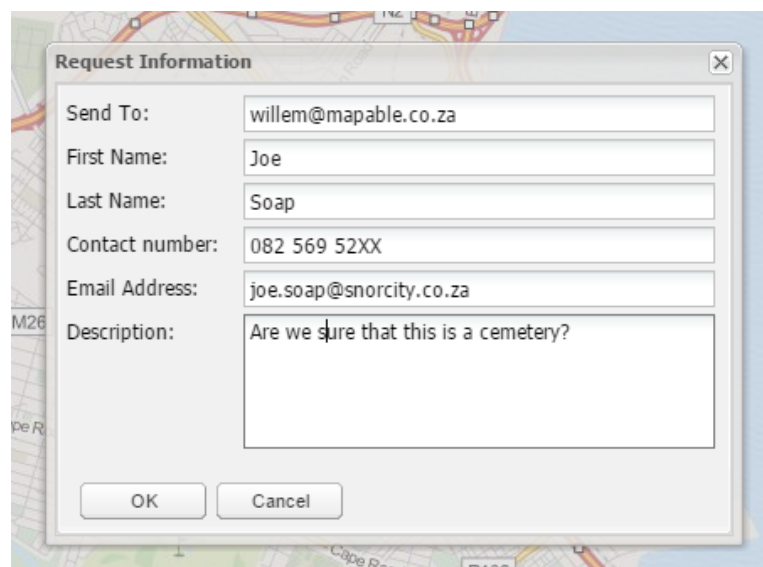
The tool menu dropdown contains the Request Info, Point Report and What3Words functions.



The request info button lets you communicate with other users, team members and even MapAble® staff to ask questions or comment on specific issues related to a specific location. Once the Request Info button is clicked, MapAble® will ask you to click on the relevant position on the map. The following popup box appears in the menu bar:



Once you have clicked on the specific location on the map, the following dialog box appears on the screen and needs to be filled in:



You can give your contact details and add a question or note in the description box. Once this is done, the email will be sent by clicking the OK button. The email will typically look like this example:

 **MapAble Webmaster** <info.request@mapable.co.za>
to willem ▾

Information Request

You have received the following information request:

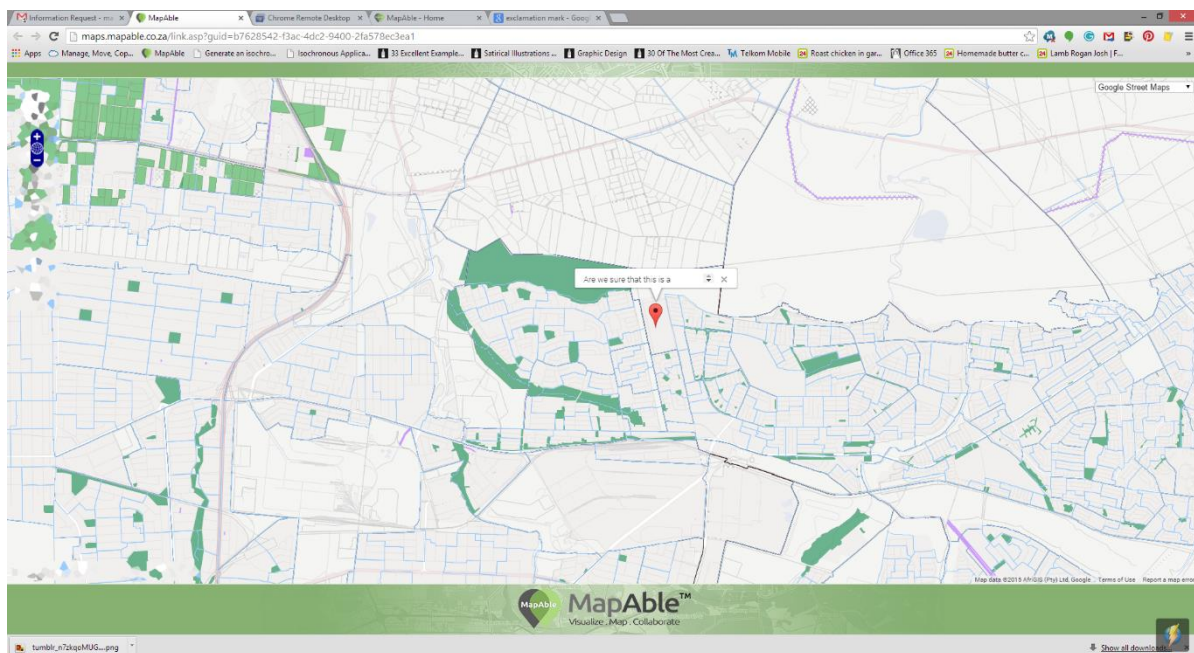
From: Joe Soap
Contact number: 082 854 66xx
Email address: joe_soap@snorcity.co.za
Coordinates: 28.325414657592773, -25.70248466043174
Description: Are we sure that this is a cemetery?

 Click [here](#) to open map.

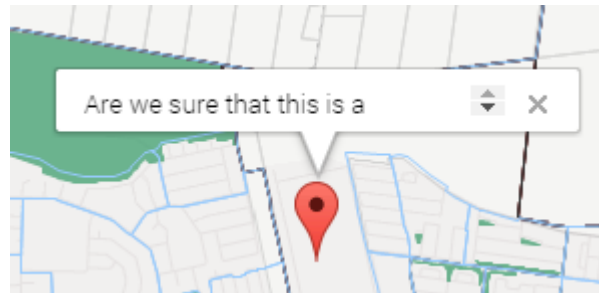
In the email the following information will be shown:

- The contact details of the sender,
- The coordinates of the point on the map, and
- The message or request.

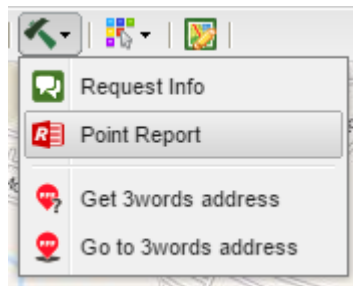
The receiver can now click on a link which will open the specific map, with all the layers that were active in MapAble®, in a browser. The specific point and the comment or question will appear next to the map as in the following example:



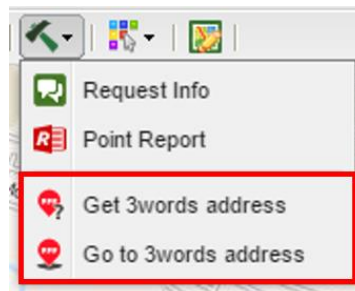
The specific location will be indicated by a red marker with the text attached to it:



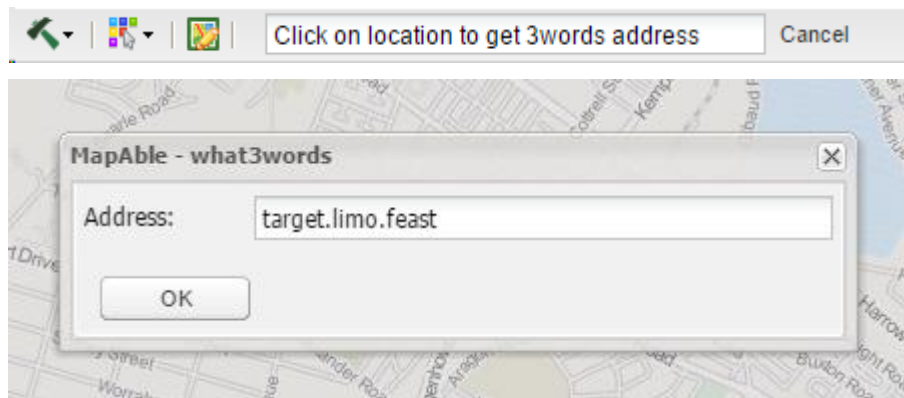
For Point Report see Reporting methods [within our Advanced MapAble training courses](#).



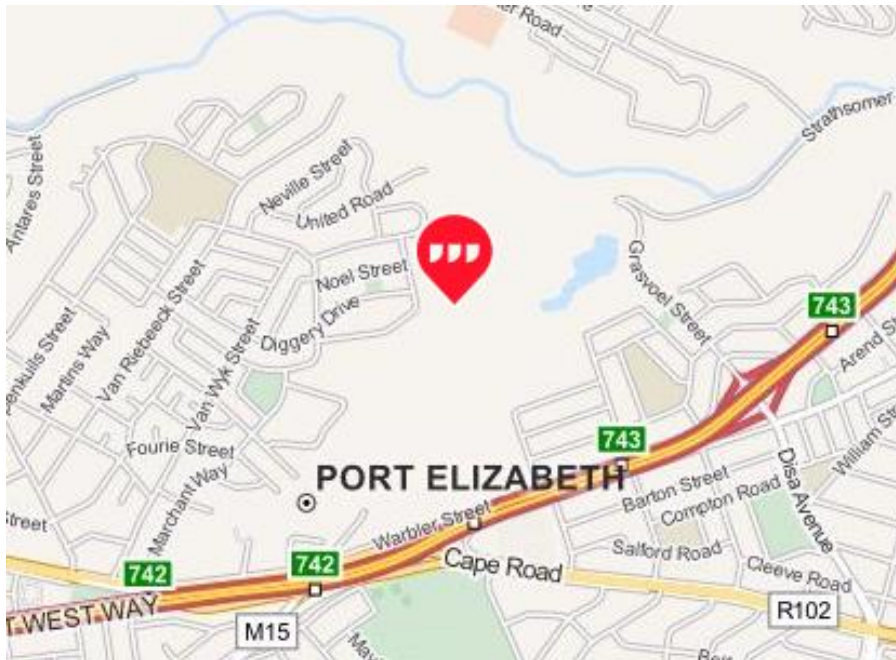
MapAble® has integrated with [What3Words](#), whose functions can be accessed via the tool menu.



The first function is to click on any place on the map, which generates a unique What3Words address.



The second function is to type into the textbox a unique What3Words address and you will be taken to the location.



8

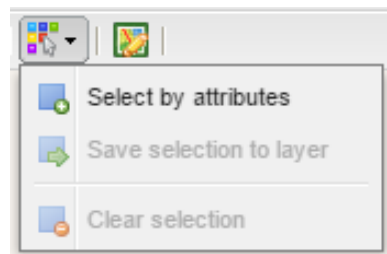
Selection Menu



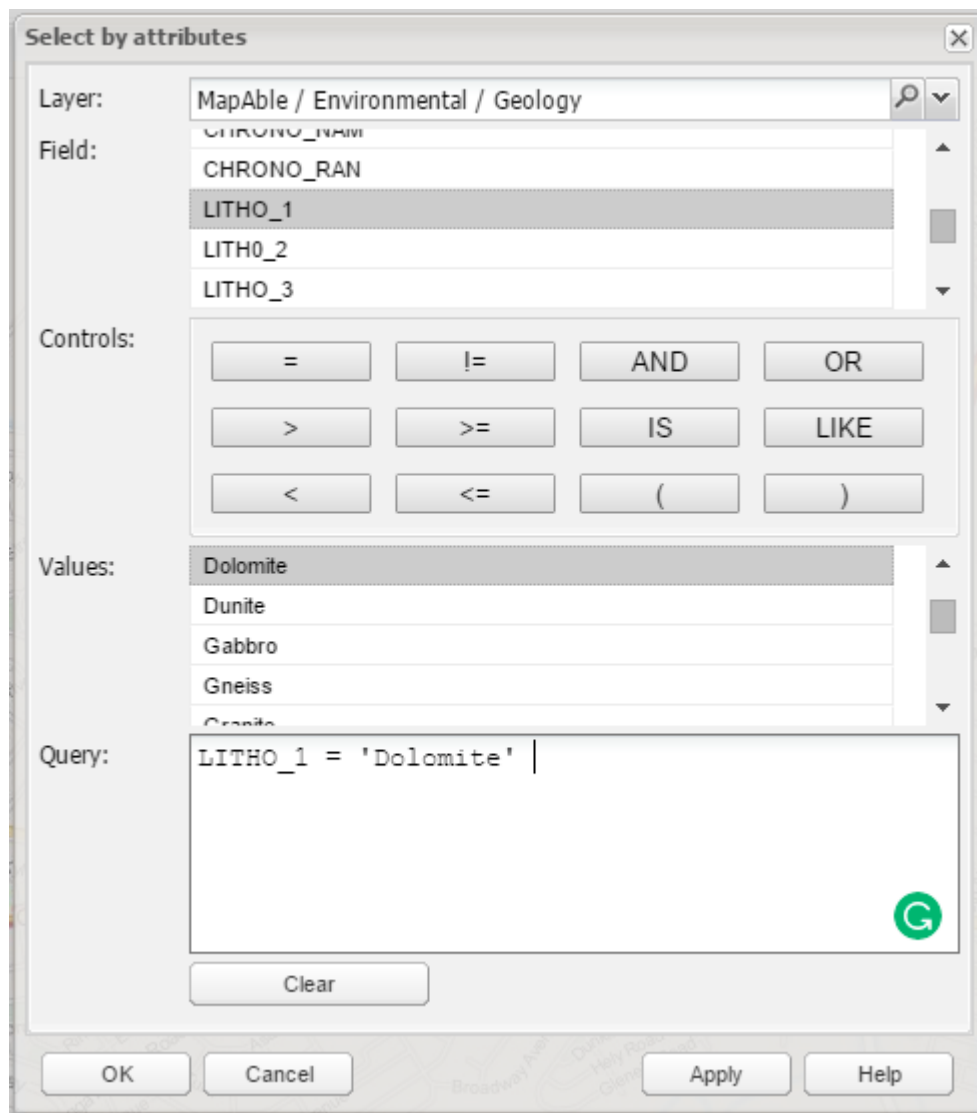
Please note:

For a more detailed description of the selection menu, please access the [Advanced MapAble training session](#)

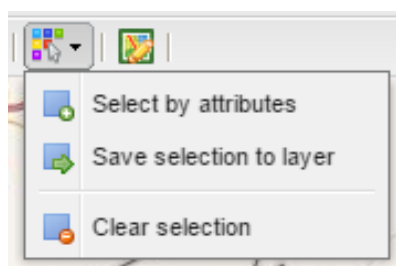
The selection menu lets you select by attributes. This means that you can select specific features of a layer.



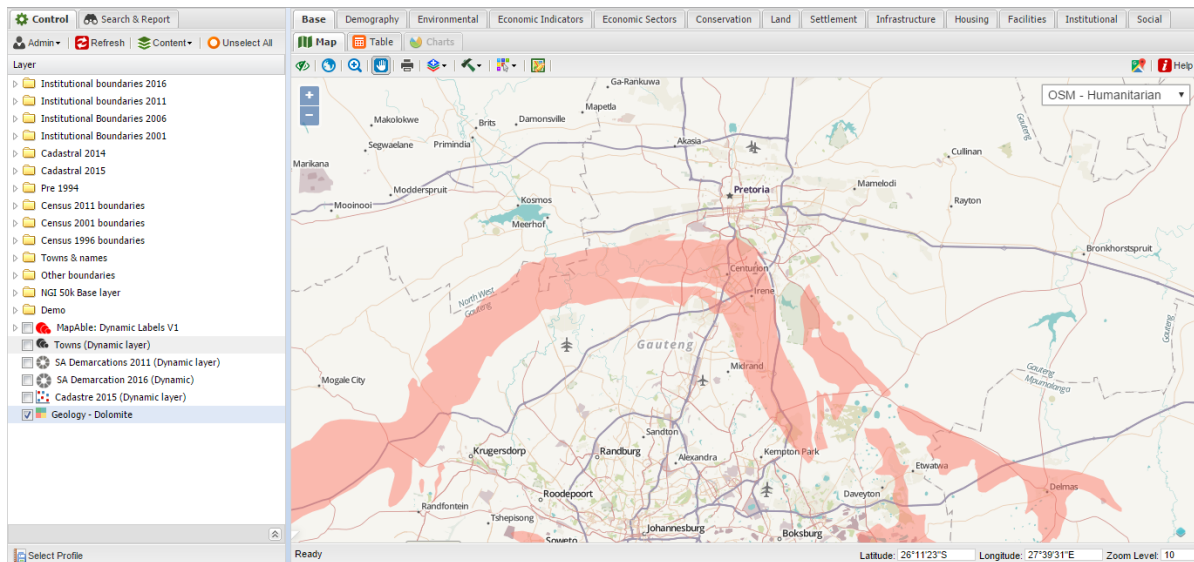
Click on 'Selection Menu' dropdown then click on the 'Select by attributes' button, this will open up the 'Select by attributes' box. The first step is to choose the relevant layer you want to select an attribute from. In this example we wanted to select all the areas where Dolomite is present. To do this, select the 'Geology' layer from the MapAble catalog and choose the 'LITHO_1' field (double click on the field. This adds the field to the query). After clicking the field, all the unique values within that field will appear. To complete the query, select the relevant boolean search terms (Controls) such as equals (=); larger than (>); smaller than (<); doesn't equal (!=), bigger and equal to (>=), smaller and equal to (<=), AND (both terms), IS (exact term), OR (both), LIKE (contains phrase - strings) and '(' ')'. Complete the query in this case the query will be "LITHO 1 = 'Dolomite'" which means all geological features that are dolomite will be selected. See image below to see how the query should look.



After you click OK, the layer will be made visible. If you are satisfied, click the selection menu again and select 'Save selection to layer' or 'Clear selection'.



After clicking 'Save selection to layer' a new layer will be created in your list of layers, where you can edit the visualisation of the layer.



9 Drawing controls

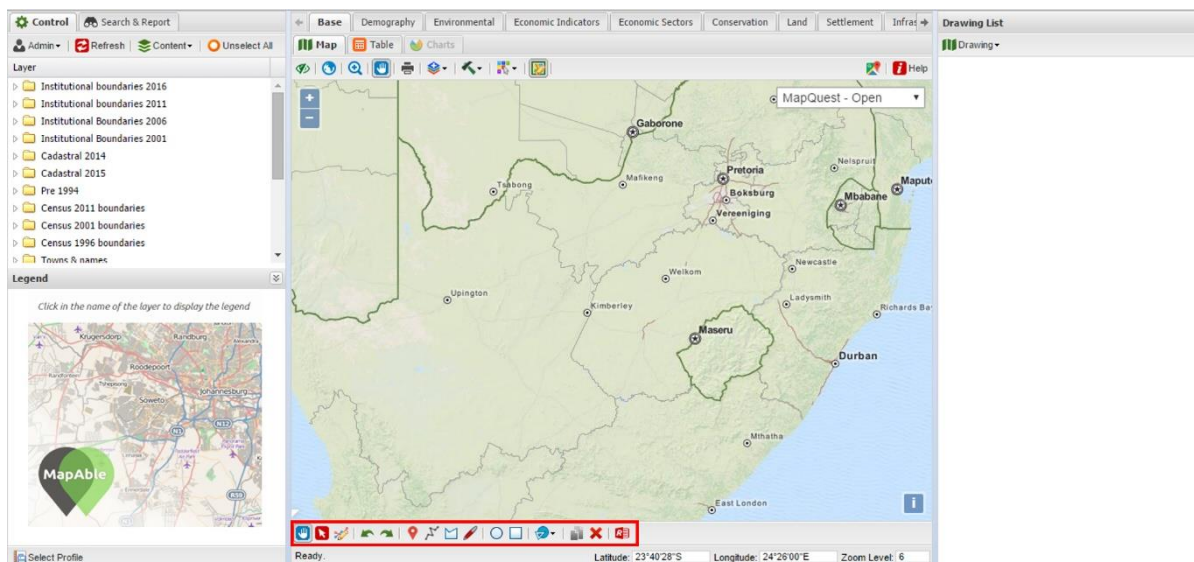
One of the most exiting tool in MapAble® is the Drawing Tools. This allows you to create drawings, make notes and run Spatial Reports from them. It can also be used to collaborate with others and communicate ideas with team members.



Please note:

For a more detailed description of the drawing tools, please see annexure 2 in this document as well as the Advanced Training Session.

You can activate the drawing controls by clicking on the Drawing controls button . A new toolbar will appear at the bottom of the view pane:

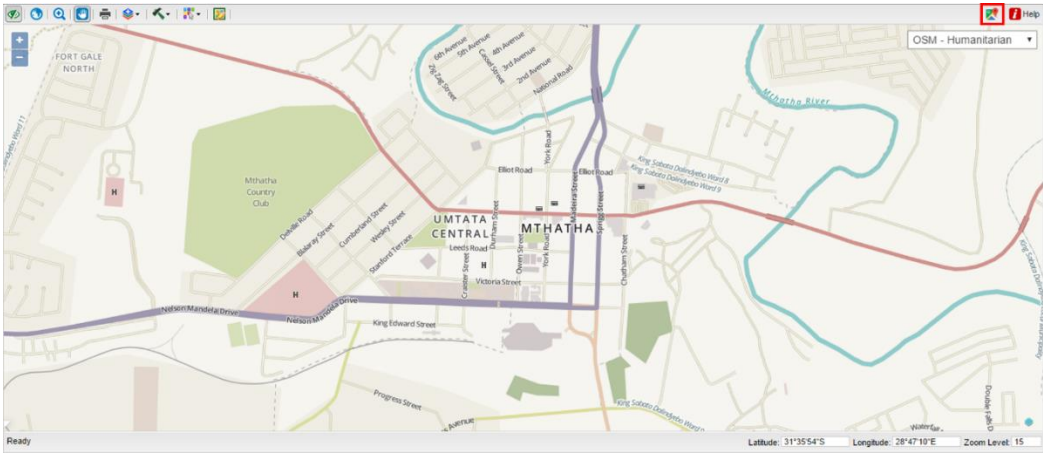


10

View in Google Maps



To see your current map extent in Google Maps®, simply click on the Google Maps® link to the top right of the Map view.



After you click on the Google Maps® link, a new window will open with the same map extent viewed in your MapAble® workspace.



Please note:

The use of Google Maps® for commercial purposes is subject to copyright. Please make sure not to infringe on any ownership or copyrights when using it. MapAble® added the link to free Google Map services for information purposes only and strongly discourage users to use them for publication of any maps from the MapAble® service.

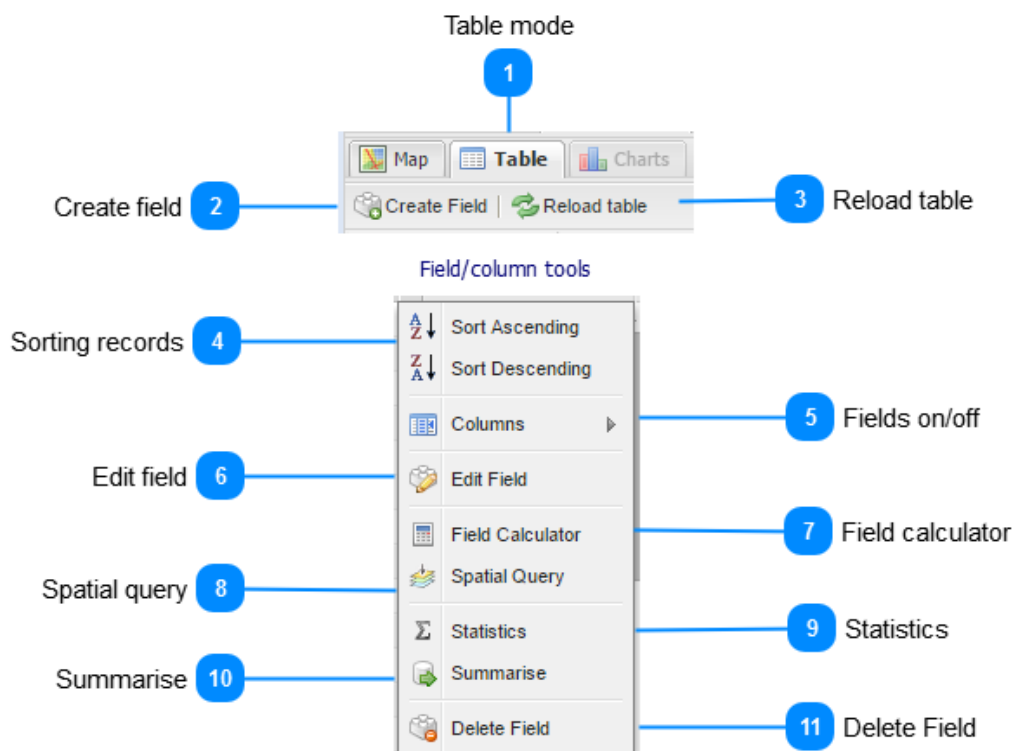
11

Help



This opens the help file from your workspace.

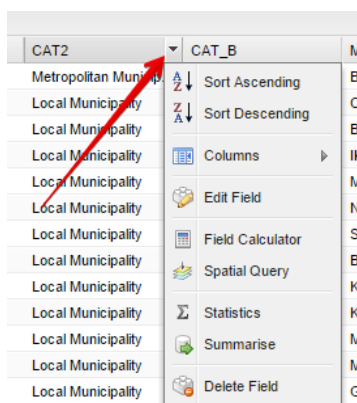
Table Mode



Please note:

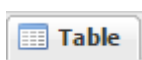
For a more detailed description of the table mode, please access the [Advanced MapAble training session](#)

Please note: To access the Field Column tools, you should select a specific field in the table and click on the dropdown arrow at the right of the field name:



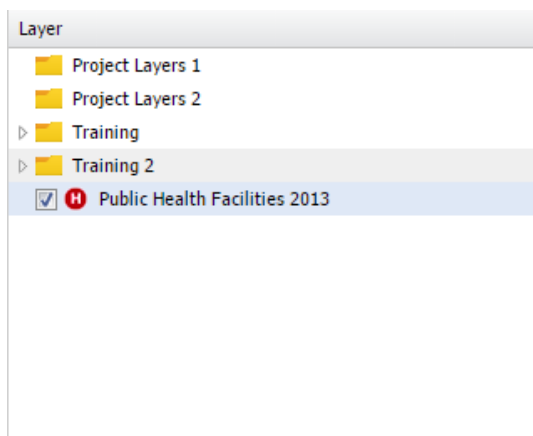
1

Table mode

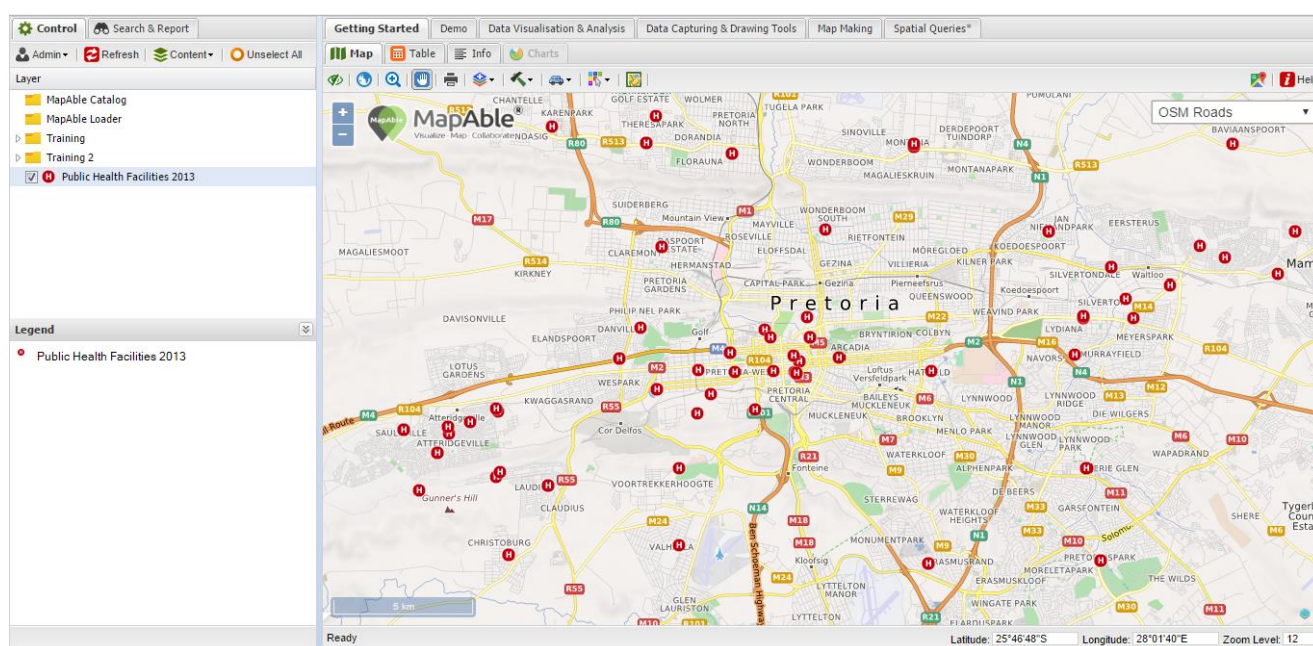


An attribute table of any of the layers displayed in the layer list can be displayed in the view pane (this excludes WMS and Tile Map Services). To be able to display a table, a layer needs to be selected in the layer list.

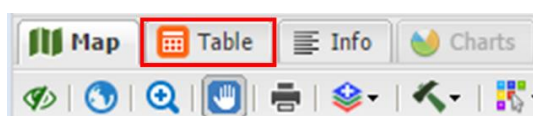
Once the layer is selected it will be colored in a blue band:



The viewpane will show the specific map:



To show the selected layer's attribute table, select the "Table" button.



The attribute table of the selected data layer will now be shown in the view pane. From here you are able to view the data, perform calculations and analysis on the attribute data⁶. This is how the table mode will look:

⁶ You can only edit your own data. Data from the Mapable catalog cannot be edited by users.

ID	SP_CODE	SP_NAME	Province	DC_Name	Munic_Name	Main_Place	Sub_Place	SP_Code
1	10101000	Doringbaai SP	WESTERN CAPE	West Coast District...	Matzika	Doringbaai	NONE	10101000
2	10102000	Ebenhaeser SP	WESTERN CAPE	West Coast District...	Matzika	Ebenhaeser	NONE	10102000
3	10103000	Klaver SP	WESTERN CAPE	West Coast District...	Matzika	Klaver	NONE	10103000
4	10103001	Klaver Ward 12	WESTERN CAPE	West Coast District...	Matzika	Klaver	Klaver Ward 12	10103001
5	10104000	Koekenaap SP	WESTERN CAPE	West Coast District...	Matzika	Koekenaap	NONE	10104000
6	10104001	Koekenaap	WESTERN CAPE	West Coast District...	Matzika	Koekenaap	Koekenaap	10104001
7	10105001	Lutzville BSB	WESTERN CAPE	West Coast District...	Matzika	Lutzville	Lutzville BSB	10105001
8	10105002	Lutzville West	WESTERN CAPE	West Coast District...	Matzika	Lutzville	Lutzville West	10105002
9	10105003	Uitsy	WESTERN CAPE	West Coast District...	Matzika	Lutzville	Uitsy	10105003
10	10106000	Matzika SP	WESTERN CAPE	West Coast District...	Matzika	Matzika	NONE	10106000
11	10106001	Klaver	WESTERN CAPE	West Coast District...	Matzika	Matzika	Klaver	10106001
12	10106002	Van Rhyndorp NU	WESTERN CAPE	West Coast District...	Matzika	Matzika	Van Rhyndorp NU	10106002
13	10106003	Vredenda NU	WESTERN CAPE	West Coast District...	Matzika	Matzika	Vredenda NU	10106003
14	10106004	Vredenda NU	WESTERN CAPE	West Coast District...	Matzika	Matzika	Vredenda NU	10106004
15	10107000	Strandfontein SP	WESTERN CAPE	West Coast District...	Matzika	Strandfontein	NONE	10107000
16	10108000	Vanrhynsdorp SP	WESTERN CAPE	West Coast District...	Matzika	Vanrhynsdorp	NONE	10108000
17	10108001	Maskamsig	WESTERN CAPE	West Coast District...	Matzika	Vanrhynsdorp	Maskamsig	10108001
18	10108002	Van Rhyndorp AH	WESTERN CAPE	West Coast District...	Matzika	Vanrhynsdorp	Van Rhyndorp AH	10108002
19	10109000	Vredenda Part 1 SP	WESTERN CAPE	West Coast District...	Matzika	Vredenda	NONE	10109000
20	10109001	Aville Park	WESTERN CAPE	West Coast District...	Matzika	Vredenda	Aville Park	10109001
21	10109002	Joe Slovo Park	WESTERN CAPE	West Coast District...	Matzika	Vredenda	Joe Slovo Park	10109002
22	10109003	Vredenda	WESTERN CAPE	West Coast District...	Matzika	Vredenda	Vredenda	10109003
23	10110001	Vredenda AH	WESTERN CAPE	West Coast District...	Matzika	Vredenda	Vredenda AH	10110001
24	10111001	Vredenda North	WESTERN CAPE	West Coast District...	Matzika	Vredenda	Vredenda North	10111001
25	10201001	Clanwilliam NU	WESTERN CAPE	West Coast District...	Cederberg	Cederberg	Clanwilliam NU	10201001
26	10201002	Pletberg NU	WESTERN CAPE	West Coast District...	Cederberg	Cederberg	Pletberg NU	10201002

Info Mode

The Info mode contains all the metadata related to the selected layer. Metadata of a layer can be edited by using the add layer from spatial database function. Metadata is data that describes other data. Meta is a prefix that in most information technology usages means "an underlying definition or description". Metadata summarizes basic information about data, which can make finding and working with instances of data easier. For example, author, date created and date modified and file size are examples of very basic document metadata. Having the ability to filter through that metadata makes it much easier for someone to locate a specific document.

The section below describes what information is contained in the Info mode:

MapAble® Info mode

To access the Info mode page of a layer, click on the Info mode item above the view pane:

Layer ID: 16587
Layer Name: Average household income 2011 pm
Layer Type: Polygon
Data Source ID: 3763
Data Source Name: Census 2011 MapAble income categories household monthly income (2
Data Source Path: MapAble / Census / Census2011 / Income

Metadata

Description: To describe the First level of the StatsSA place name category, namely i
Abstract: To describe the First level of the StatsSA place name category, namely i
Keywords: Cultural, Society, Demography, Census 2011, Administrative Boundaries
Owner Name: Willem Badenhorst
Owner Organisation: MapAble (pty) Ltd
Owner Position: Data content manager
Source Name: Pali Lehohla
Source Organisation: Statistics South Africa (Stats SA): Head Office
Source Position: Statistician-General
Source Address: De Bruyn Park Building, 170 Andries Street
Source City: Pretoria
Source Area: Gauteng
Source Country: ZA
Credits: Statistics South Africa, Census 2011. Demographic information was sup
Usage Limits: The data resides in the public domain. Demographic information was su

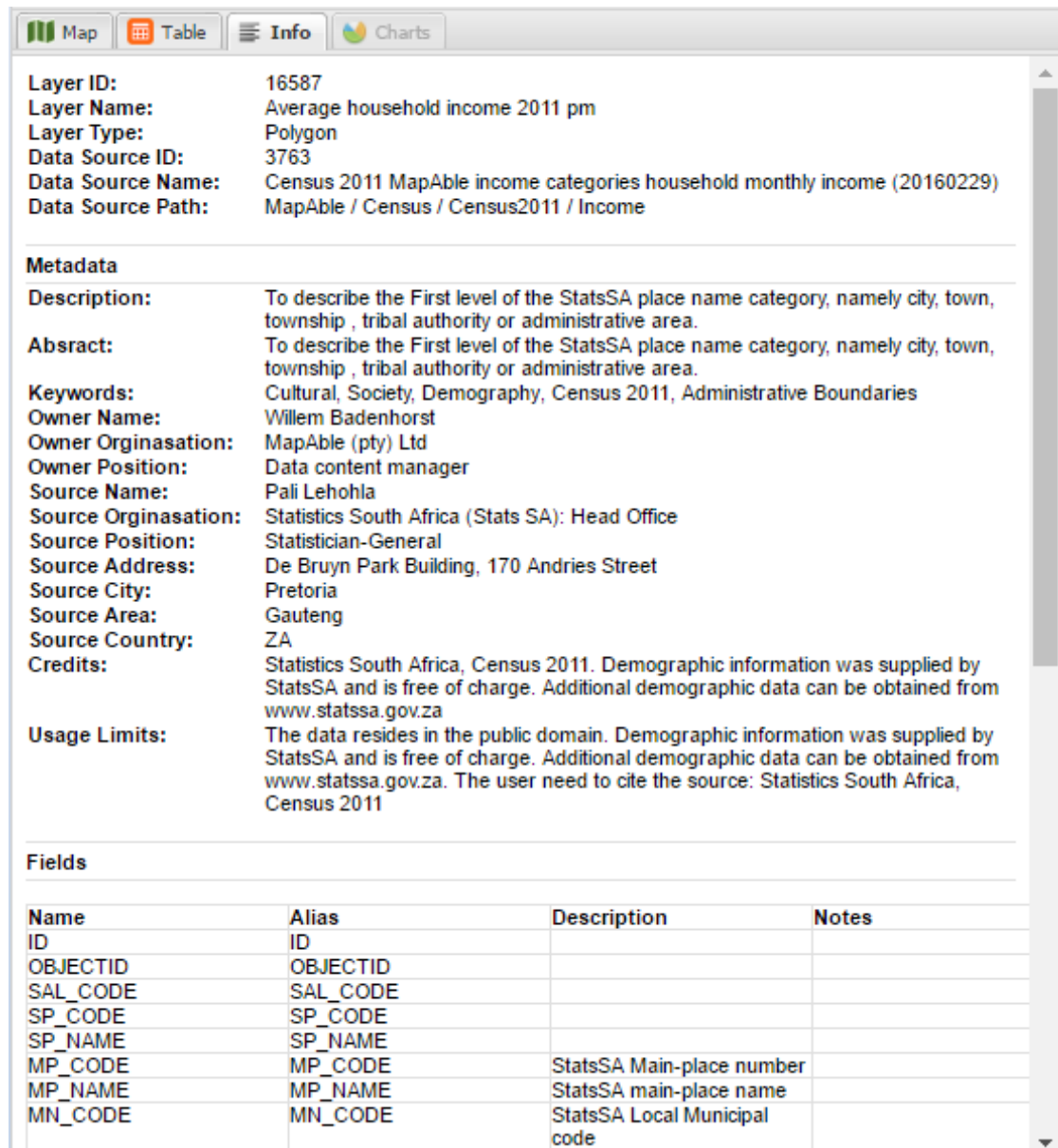
Once the Info Tab is selected the metadata related to the layer is displayed. Of the fields, the most important of the fields are the following:

1. Layer Name,
2. Summary,

3. Keywords,
4. Metadata Author,
5. Custodian Organisation,
6. Credits, and
7. Usage limit etc.

The fields table lets the you describe the fields in the attribute table of each layer. This is very important when other team members need to understand the information they are working with and what each field means.

1. Alias - Since the field descriptions of GIS files are normally limited in size, they are not very descriptive.
2. Description - offers the user a space to give a more detailed description of the field.



The screenshot shows the 'Info' panel in QGIS. At the top, there are tabs for 'Map', 'Table', 'Info', and 'Charts'. The 'Info' tab is selected. Below the tabs, the following metadata is displayed:

- Layer ID:** 16587
- Layer Name:** Average household income 2011 pm
- Layer Type:** Polygon
- Data Source ID:** 3763
- Data Source Name:** Census 2011 MapAble income categories household monthly income (20160229)
- Data Source Path:** MapAble / Census / Census2011 / Income

Below the metadata, there is a section for 'Metadata' with the following details:

- Description:** To describe the First level of the StatsSA place name category, namely city, town, township, tribal authority or administrative area.
- Abstract:** To describe the First level of the StatsSA place name category, namely city, town, township, tribal authority or administrative area.
- Keywords:** Cultural, Society, Demography, Census 2011, Administrative Boundaries
- Owner Name:** Willem Badenhorst
- Owner Organisation:** MapAble (pty) Ltd
- Owner Position:** Data content manager
- Source Name:** Pali Lehohla
- Source Organisation:** Statistics South Africa (Stats SA): Head Office
- Source Position:** Statistician-General
- Source Address:** De Bruyn Park Building, 170 Andries Street
- Source City:** Pretoria
- Source Area:** Gauteng
- Source Country:** ZA
- Credits:** Statistics South Africa, Census 2011. Demographic information was supplied by StatsSA and is free of charge. Additional demographic data can be obtained from www.statssa.gov.za
- Usage Limits:** The data resides in the public domain. Demographic information was supplied by StatsSA and is free of charge. Additional demographic data can be obtained from www.statssa.gov.za. The user need to cite the source: Statistics South Africa, Census 2011

Below the metadata, there is a section for 'Fields' with a table showing the following fields:

Name	Alias	Description	Notes
ID	ID		
OBJECTID	OBJECTID		
SAL_CODE	SAL_CODE		
SP_CODE	SP_CODE		
SP_NAME	SP_NAME		
MP_CODE	MP_CODE	StatsSA Main-place number	
MP_NAME	MP_NAME	StatsSA main-place name	
MN_CODE	MN_CODE	StatsSA Local Municipal code	

Annexure 1: Visualise a layer/your data

The data Visualisation Inputs dialog Box can be accessed by double clicking on a data layer in the list of layers or via the Content>Edit layer button. The Edit Layer function allows the user to customise the appearance of a vector data layer. The edit layer box is displayed below:

Edit Layer

Layer Name: Population Density (SP) 2001

File: SPDB:2822

Type: Polygon

Search Field: Density

ToolTip Field: Density

Report Field: ID

Icon: red2yellow2blue.png

Legend: Select an image

Opacity (0-255): 150

Drawing Order: Normal

Preview:

Visualisation | Labels | Info Box | Layer Description

Single Symbol | Unique Values | **Class Breaks**

Select Field: Density

Border Colour:

Calculate:

Values:

From	To	Colour	Order
0	0.01	95CAFF	1
0.01	0.5	55AAFF	2
0.5	1	339966	3
1	2	9FD500	4
2	4	FFF295	5
4	8	FFD555	6

The main features of the edit layer box are described below:

Main layer input fields

The Main Layer input field are a set of inputs that manages the layer's description, appearance in the list of layers as well as Search and Tooltip fields selection.

The diagram illustrates the 'Main Layer input fields' form with ten numbered callouts pointing to specific fields:

- 1. Layer name
- 2. File
- 3. Type
- 4. Search field
- 5. Tooltip
- 6. Icon
- 7. Legend
- 8. Opacity
- 9. Drawing Order
- 10. Icon Preview

The form fields are as follows:

Layer Name:	Population Density (SP) 2001
File:	SPDB:2822
Type:	Polygon
Search Field:	Density
ToolTip Field:	Density
Icon:	red2yellow2blue.png
Legend:	Select an image
Opacity (0-255):	150
Drawing Order:	Normal
Preview:	

1 Layer name

You can give the specific layer an applicable name and edit it at any later stage.

2 File

The file name is an Administrative entry which indicates the layer's ID in the spatial database. The users cannot change it.

3 Type

The file type is an Administrative entry which indicates the layer's spatial type in the spatial database. The users cannot change it.

4 Search field

You can add a search field if you want to use this layer as a [searchable layer](#) to navigate with or run [spatial reports](#) from it.

5 Tooltip

The Tooltip function is a tool which, when setup correctly, will show the value of a selected column in the attribute table at the mouse point when the you hover over an area. It typically looks like this:



Please note: Only use this tool with layers with unique values per entity

Not all layers or their attributes should be regarded as searchable. An example of a good searchable layer is Towns. Each town is represented by a single point entity and once it is selected in the search box, it will zoom to that specific entity. An example of layer that is not regarded as searchable is Geology. There are many polygons in the set with the same attribute. One cannot search and zoom to more than one polygon at once. Thus, same layer will be unsuitable and illogical to be used with this function.

You can set the Tooltip by selecting the appropriate attribute column in the dropdown list:

ToolTip Field:	MUNICNAME
Icon:	ID
Legend:	PROVINCE
Opacity (0-255):	CATEGORY
Drawing Library:	CAT2
Preview:	CAT_B
	MUNICNAME
	MAP_TITLE
	DISTRICT
	AREA
	Shape_Leng
	Shape_Area
	MapNo
	MUN_CD

The selected field will now appear in the Tooltip field:

Type:	Polygon
Search Field:	MUNICNAME
ToolTip Field:	MUNICNAME
Icon:	polyGreyThin.png

6

Icon

The icon is the image that will appear on the left of the layer name in the list of layers. You can add any icon of your choice. The only requirement is that it should preferably be at a size 16x16 pixels or smaller to appear correctly in the legend.

MapAble Icon Set:



To assist users, MapAble has a set of icons which can be used by all users. Please go to the [MapAble website](#) and download it.

7

Legend

The [Legend](#) is normally automatically generated for all vector images. In the case of graphics and layers derived from WMS services, a legend file can be uploaded to the server. This will always have to be in PNG graphic format. The suggested size is 270x270 pixels.

8

Opacity

The Opacity for the layer can be set at two places in MapAble. This opacity tool in the Main Layer Input Box can be used to set the global opacity of the layer. Some individual items can be set in the [Thematic visualisation toolbox](#).

The opacity is measured in an index of 0 - 255 of which 0 = no opacity (fully transparent) and 255 = fully visible.

9

Drawing Order

The Drawing Order refers to the way MapAble renders polygons and polylines. The Drawing Order is important in the construction of maps where you may want certain layers to be displayed above others, such as place names above certain polygons. A layer can either be positioned the top or bottom most or normal which means the layer order in the layer list.

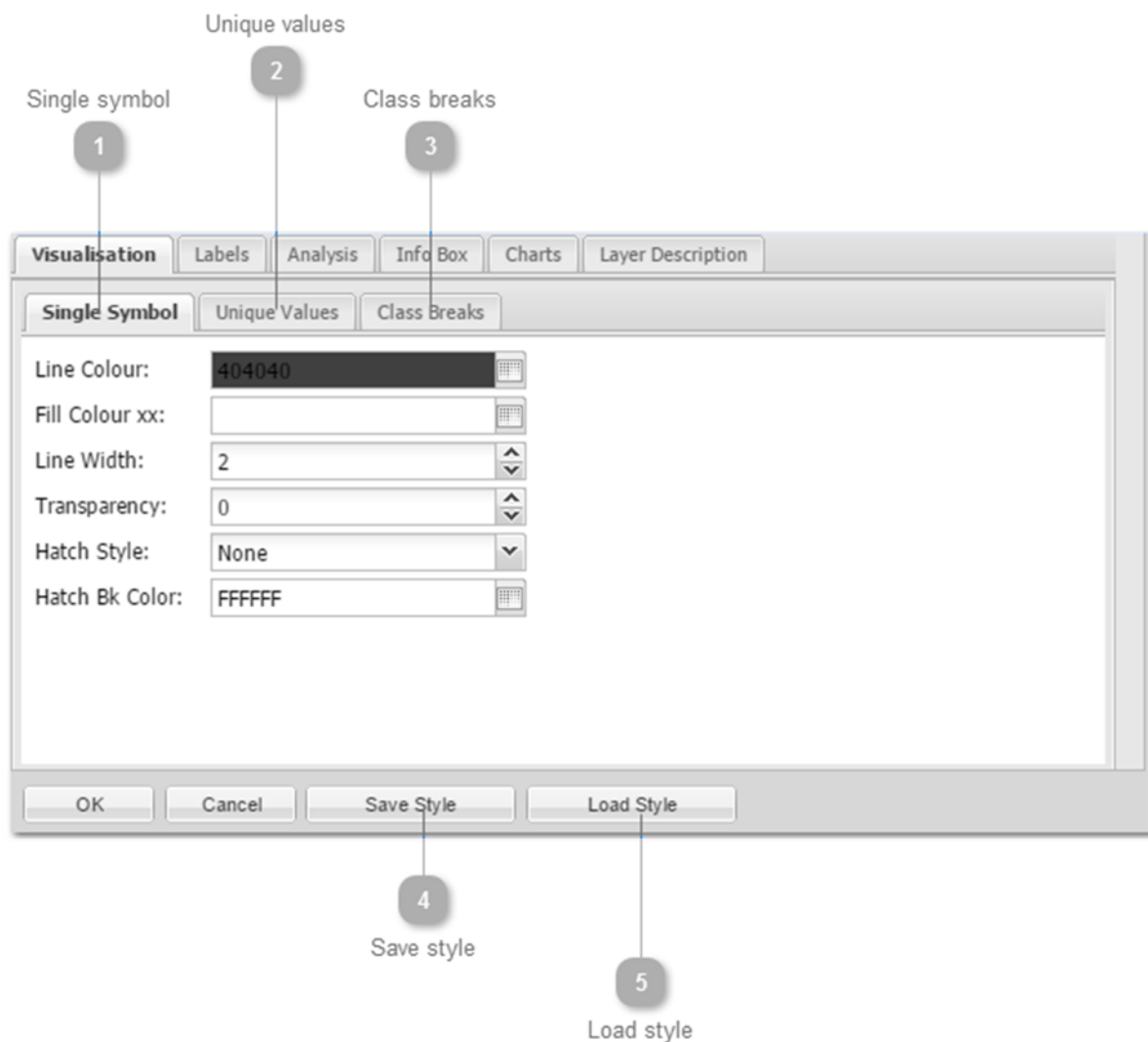
Normal	▼
Top Most	
Normal	
Bottom Most	

10

Icon Preview

Preview:	
----------	--

The [Icon](#) Preview shows how the selected Icon will look like in the List of Layers.



Thematic visualisation is the way in which a data layer is displayed on a map. There are many ways of visualising data. MapAble offers three different ways of displaying data in the [View Pane](#).

1 Single symbol

The Single Symbol is the simplest way of displaying a layer. Only one foreground color and one outline color are used to display a layer. Different toolsets are available for different types of vectors. The following tools will assist you to prepare a single symbol layer:

Polygons

Line colour:

The line colour refers to the outline of polygons. Click on the  button to get colour options or type in any HEX color code of your choice

Fill colour:

The fill colour is the colour of the body of the polygon. Click on the  button to get colour options or type in any HEX color code of your choice

Line width:

The outline width can be set by typing in a number or by using the arrows 

Transparency:

The Transparency can be set from 0 to 255 of which 0 = No Transparency

Hatch style:

MapAble offers a range of Hatching styles. Click on the dropdown button to view all styles.

Hatch background colour:

The hatching color can be set here. Click on the  button to get colour options or type in any HEX color code of your choice

Polylines

Line colour:

Click on the  button to get colour options or type in any HEX color code of your choice

Line width:

The outline width can be set by typing in a number or by using the arrows 

Transparency:

The Transparency can be set from 0 to 255 of which 0 = No Transparency.

Line Border:

An additional line border can be set in the tickbox to mask the line for better readability.

Border colour:

The line border colour can be set here. Click on the  button to get colour options or type in any HEX color code of your choice

Points

Icon:

This is the icon to be displayed on the map. This will normally be the same as the Icon in the [menu item](#). Choose an appropriate icon and upload it to the server. To assist users, MapAble has a set of icons which can be used by all users. Please go to the [MapAble website](#) and download it.

Icon width and height:

This gets automatically filled in when the icon is uploaded. You can, however, change the size to make it smaller. It is not ideal to make it larger because the icon image will pixelate and result in a poor map.

Icon anchors X & Y:

This is the position where the icon will anchor relative to the centre of the spatial point. This is normally set to be the centre of the image, but can be changed if necessary. The centre position is normally the middle of the width and height number

Icon shadow:

A shadow can be set for each icon by ticking the tickbox.

Cluster points:

If a point layer causes a map to be too busy, they can be displayed as cluster points instead. Cluster point shows a group of spatially clustering points as a single point with a colour code.

Preview:

This shows how the icon will be displayed on the map.

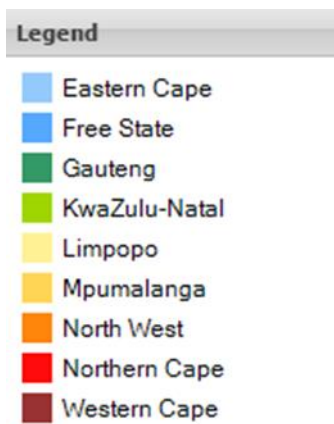
2

Unique values

Unique Values

Unique values are applied when data layers have several explicit classes (e.g. Province names, Geological types). Different toolsets are available for different types of layers. The following tools will assist you to prepare a unique value layer:

Polygons



Single Symbol Unique Values Class Breaks

Select Field: PROVNAME

Values: Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, North West

Line Colour: FFFFFFFF

Fill Colour xx: 95CAFF

Line Width: 1

Transparency: 0

Hatch Style: None

Hatch Bk Color: FFFFFFFF

Load: Load Palette

Select field:

To start, select a field in the attribute table where the unique values reside. Click on the dropdown box to choose.

Values:

The list of unique values will be displayed in the list box after the field is selected.

Line colour:

The line colour refers to the outline of polygons. Click on the  button to get colour options or type in any HEX color code of choice.

Fill colour:

The fill colour is the colour of the body of the polygon. Click on the  button to get colour options or type in any HEX color code of choice.

Line width:

The outline width can be set by using the arrows .

Transparency:

The Transparency can be set from 0 to 255 of which 0 = No Transparency.

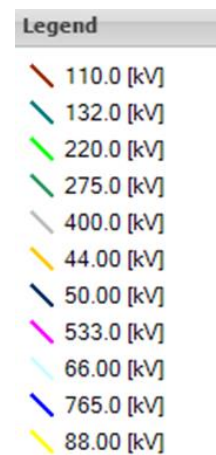
Hatch style:

MapAble offers users a range of Hatching styles. Click on the dropdown button to view all styles.

Hatch background colour:

The hatching color can be set here. Click on the  button to get colour options or type in any HEX color code of choice.

Polylines



Single Symbol Unique Values Class Breaks

Select Field: voltage

Values: 110.0 [kV], 132.0 [kV], 220.0 [kV], 275.0 [kV], 400.0 [kV], 44.00 [kV], 50.00 [kV]

Line Colour: 00FF00

Line Width: 2

Transparency: 0

Line Border: ☐

Border Colour: 800000

Select field:

To start, select a field in the attribute table where the unique values reside. Click on the dropdown box to choose.

Values:

The list of unique values will be displayed in the list box after the field is selected.

Line colour:

Click on the  button to get colour options or type in any HEX color code of choice.

Line width:

The line width can be set by using the arrows .

Transparency:

The Transparency can be set from 0 to 255 of which 0 = No Transparency.

Line Border:

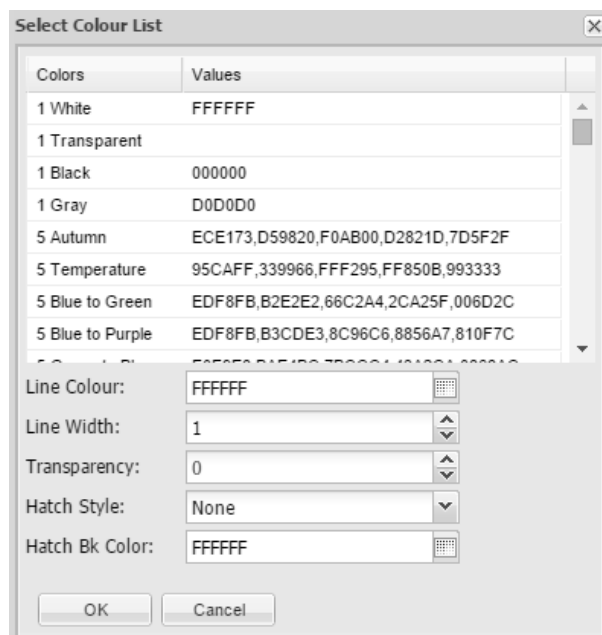
An additional line border can be set in the tickbox to mask the line for better readability.

Border colour:

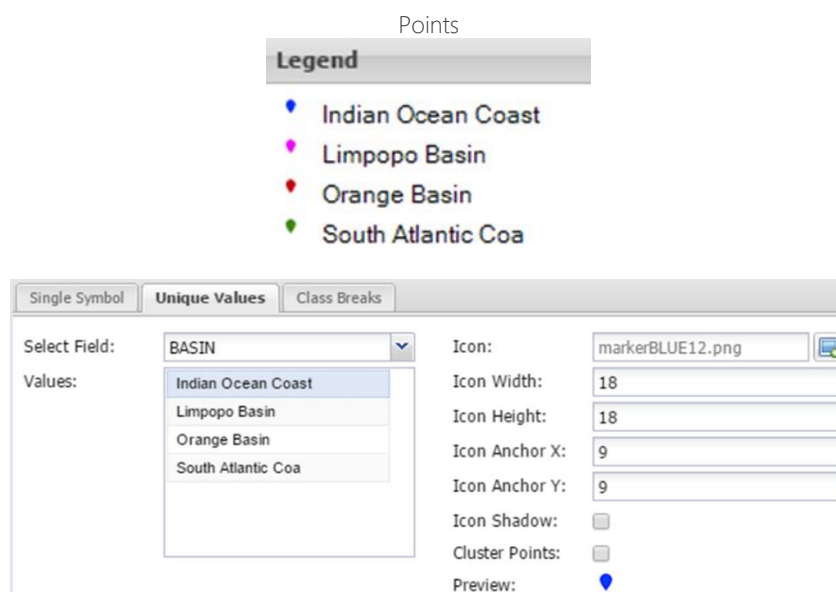
The line border colour can be set here. Click on the  button to get colour options or type in any HEX color code of choice.

Load Palette:

Predefined colour palettes can be loaded from here to automatically do the colours of all the unique values. The user click on the Load Palette button to open a list box to choose from:



From here the outline colour can also be set.



Select field:

To start, select a field in the attribute table where the unique values reside. Click on the dropdown box to choose.

Values:

The list of unique values will be displayed in the list box after the field was selected.

Icon

This is the icon to be displayed on the map. Choose an appropriate icon and upload it to the server. To assist users, MapAble has a set of icons which can be used by all users. Please go to the [MapAble website](#) and download it.

Icon width and height:

This gets automatically filled in when the icon is uploaded. You can, however, change the size to make it smaller. It is not ideal to make it larger because the icon image will pixelate and result in a poor map.

Icon anchors X & Y:

This is the position where the icon will anchor relative to the centre of the spatial point. This is normally set to be the centre of the image, but can be changed if necessary. The centre position is normally the middle of the width and height number.

Icon shadow:

A shadow can be set for each icon by ticking the tickbox.

Cluster points:

If a point layer causes a map to be too busy they can be displayed as cluster points instead. Cluster point shows a group of spatially clustering points as a single point with a colour code.

Preview:

This shows how the icon will be displayed on the map.



When mapping quantities (numeric values), it is often better to illustrate them using class breaks. When you classify your data, you can use two standard classification methods provided in MapAble, or you can manually define your own custom class ranges. This section describes these classification methods:

Polygons and Polylines

Legend	Legend
 251,526 - 4736,09775	 0,424853 - 125,930443
 4736,09775 - 9220,6695	 126,732857 - 1188,20459
 9220,6695 - 13705,24125	 1190 - 3078,717041
 13705,24125 - 18189,813	 3079,863525 - 5425,068359
 18189,813 - 22674,38475	 5425,524902 - 8924,357422
 22674,38475 - 27158,9565	 8931,006836 - 15274,832031
 27158,9565 - 31643,52825	 15302,363281 - 28604,365234
 31643,52825 - 36128,1	 28638,021484 - 518535,625
	

Single Symbol Unique Values **Class Breaks**

Select Field: AREA

Border Colour: FFFFFFFF

Calculate: Calculate Save Colours Load Colours

Values:

From	To	Colour
251.526	4736.09775	95CAFF
4736.09775	9220.6695	55AAFF
9220.6695	13705.24125	339966
13705.24125	18189.813	9FD500
18189.813	22674.38475	FFF295
22674.38475	27158.9565	FFD555
27158.9565	31643.52825	FF850B

Select field:

To start, you need to select a field in the attribute table which contain the values. Click on the dropdown box to choose.

Border colour:

The border colour refers to the outline of polygons. Click on the  button to get colour options or type in any HEX color code of your choice.

Calculate:

To calculate the classes the click on the Calculate Button. The following screen will appear:

Calc Class Breaks

Select Count: 10

Classification: linear

Start Colour: FF0000

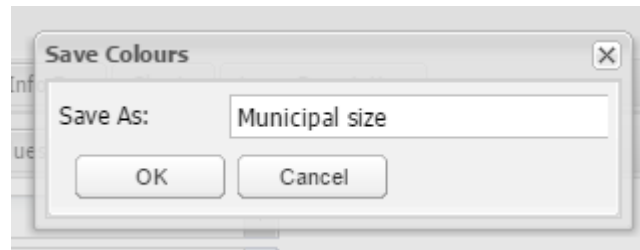
End Colour: 00FF00

OK Cancel

Select the number of classes you want, the method of classification, either Linear (Equal intervals) or Quantiles, the start (low numbers) and end (high numbers) colours. You can still manually edit the colours from the Values display after the initial classification.

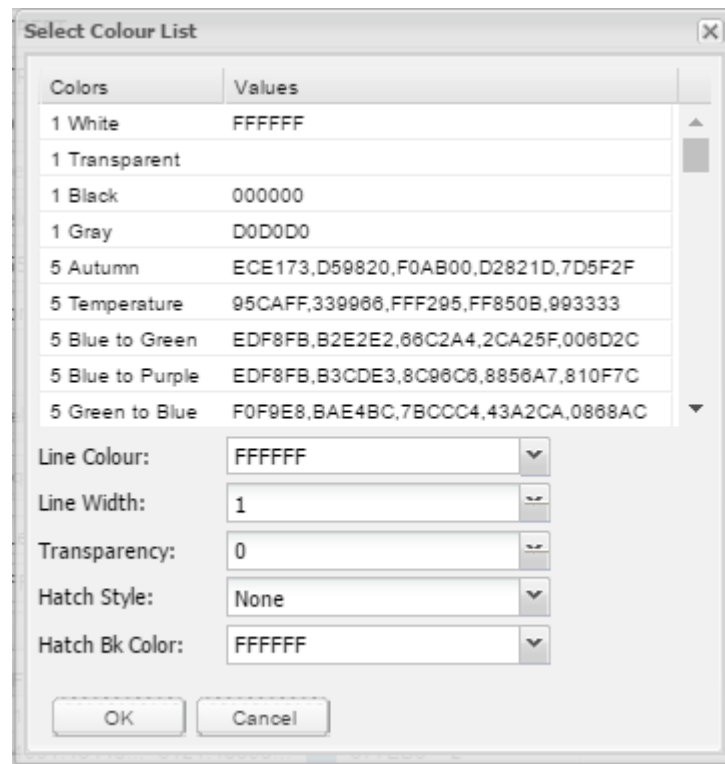
Save colours:

You can save a colour set by using the save colours button. The following input box will appear:



Load colours:

All save colour palettes can be loaded afterwards by using the load colours button from where a list of colours palettes will be shown

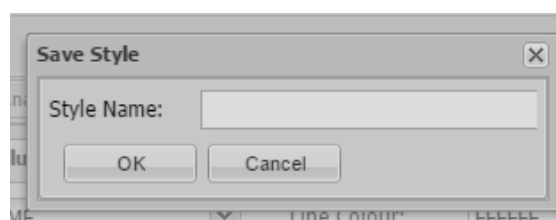


Values:

The final legend values and colours can be viewed in the values box. You can still edit the colours as well as the values from the Values box itself.

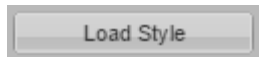


A style is a file that remembers all the visualisation settings of a particular layer. You can save the style with an appropriate descriptive name:

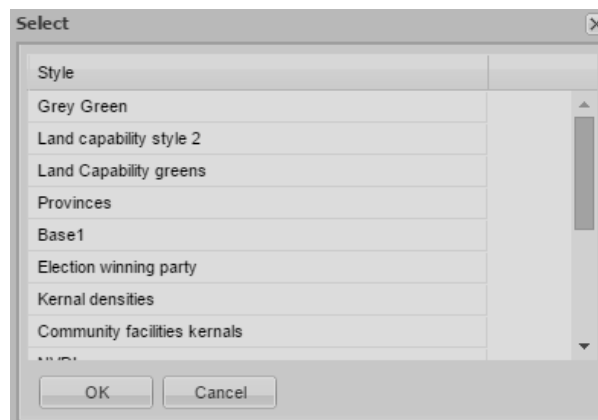


5

Load style



A saved style can always be opened for later use by opening the Load style button:



The user can select the style and the layer's visualisation setting will change accordingly.



Please note:

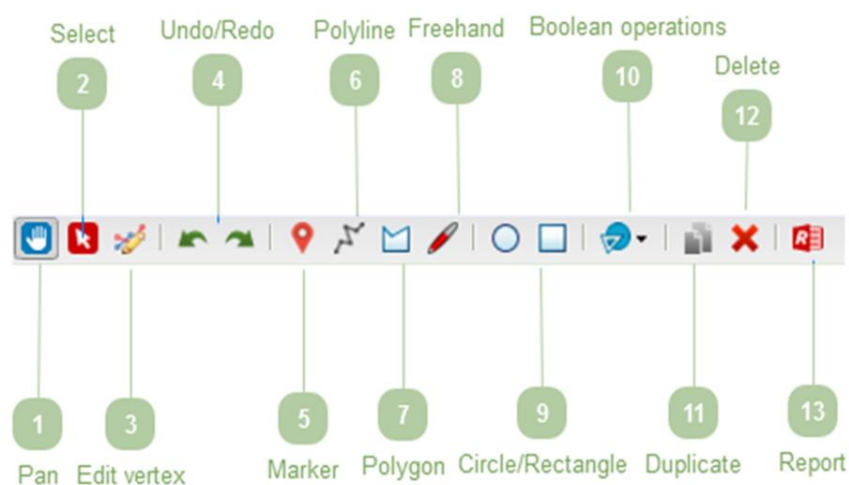
A saved style can only be re-applied to the same layer. All the saved settings are only applicable to the structure of the specific layer it was built upon.

Examples of point/polyline/polygon in terms of single symbol, unique value and class break visualisation:



Annexure 2: Drawing Tools

The drawing control bar has the following tools:



1 Pan

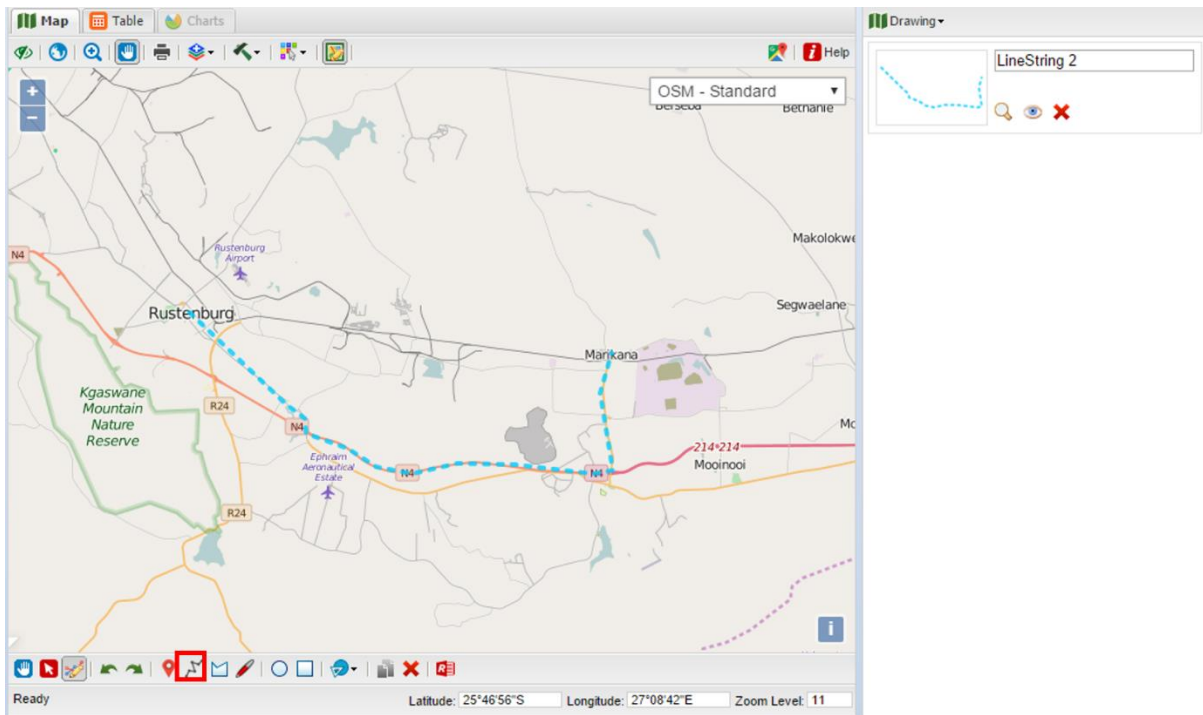
The Pan tool is the same as the pan tool in the map controls and lets you pan the whole map in any direction.

2 Select

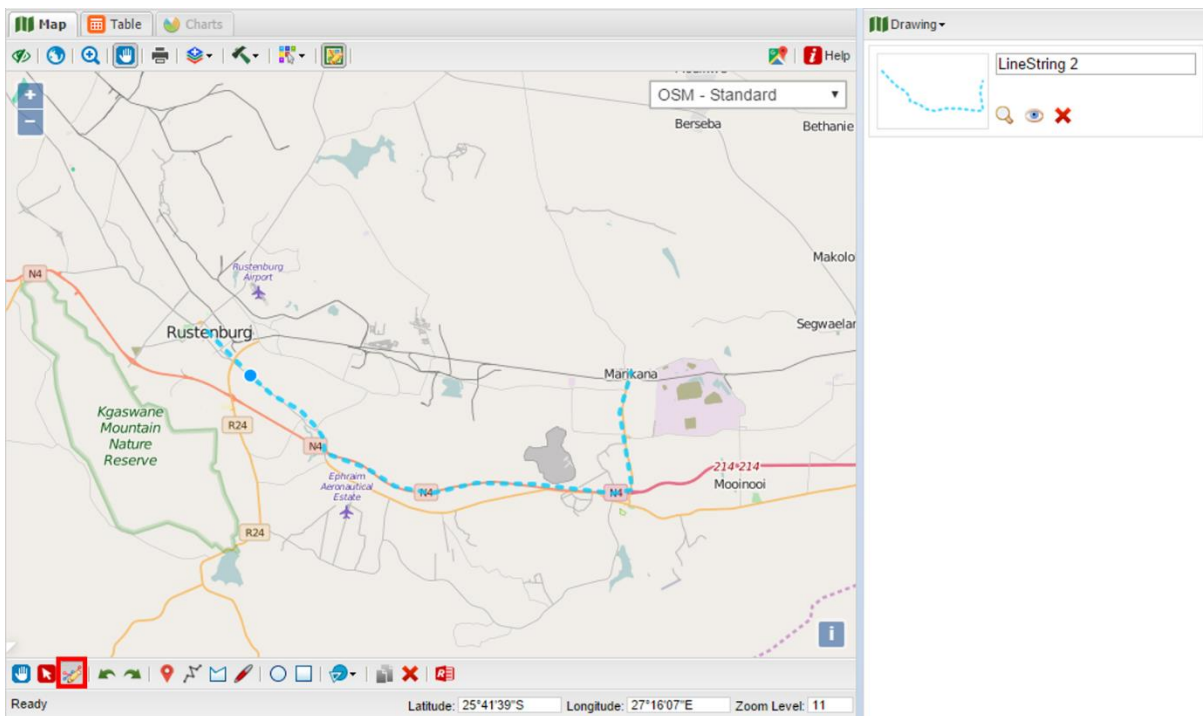
Select a drawing or feature by clicking the select item and then clicking on the specific drawing in the view pane.

3 Edit vertex

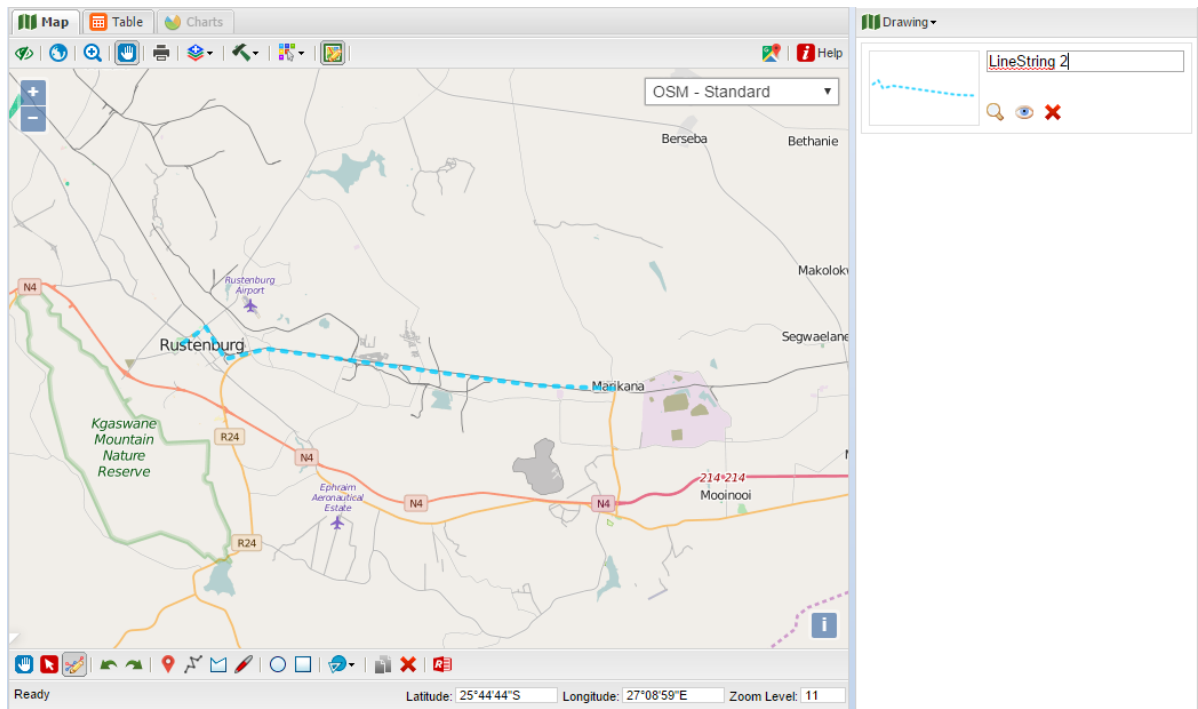
You can edit the drawings you made, to either move or refine a feature. First select or draw a polyline or polygon (points can be moved by selecting and drawing point).



Activate the edit vertex button in the drawing tools menu. Move your cursor over the features edge, where after your cursor will change into a circle. To edit a vertex, click on the features edge and drag to where you want the vertex to be.



All edits to the feature can be saved from within the drawing dropdown located above the drawing list.

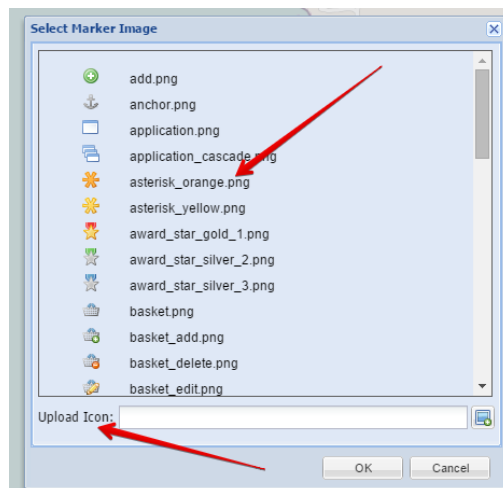


4 Undo/Redo

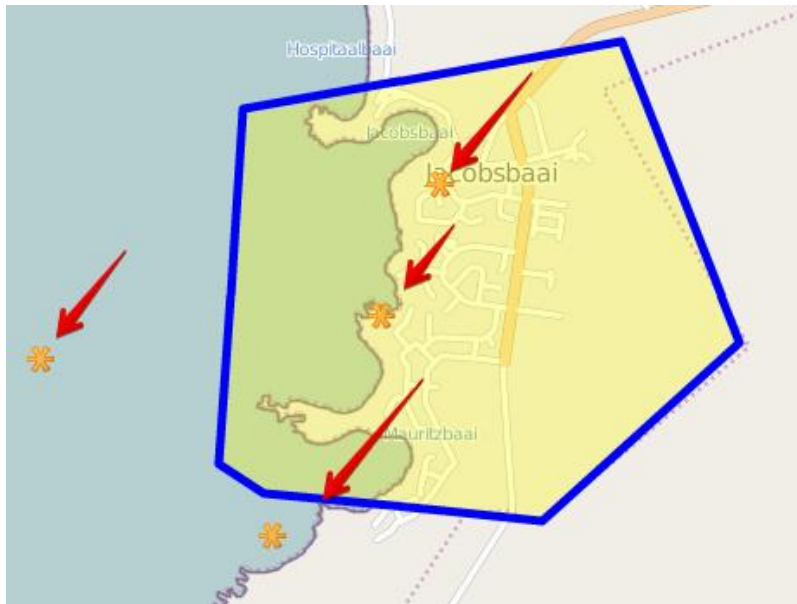
To undo an action, click the undo button or to redo an action click the redo button.

5 Marker

The user can add points on the map and select an icon to represent them:



A custom icon can also be uploaded from the Select Marker dialog box. Once a marker icon is selected, the user can add points on the map:



To edit, select the object and hover mouse over vertex to be moved, click on it and drag.

6 Polyline

The Polyline Tool lets the user draw polylines by clicking new vertex positions on the map:



To edit, select the object and hover mouse over vertex to be moved, click on it and drag.

7 Polygon

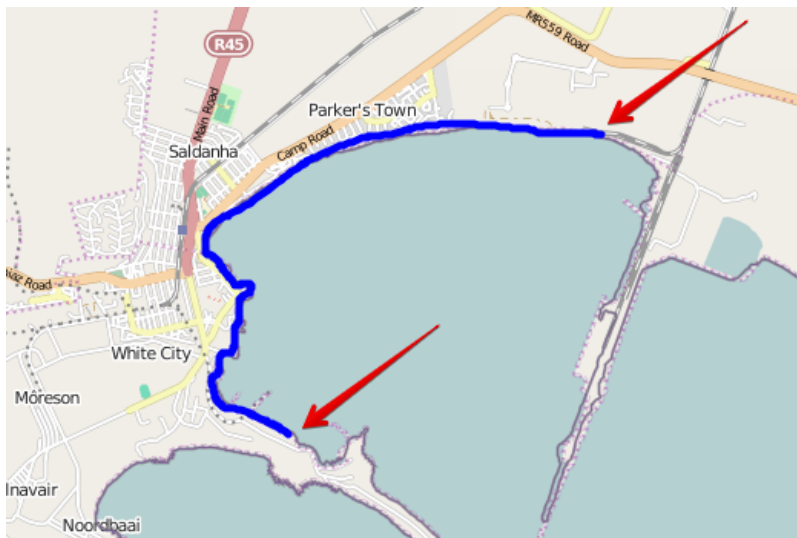
Polygons can be added by clicking the corner vertexes on the map.



To edit, select the object and hover mouse over vertex to be moved, click on it and drag.

8 Freehand

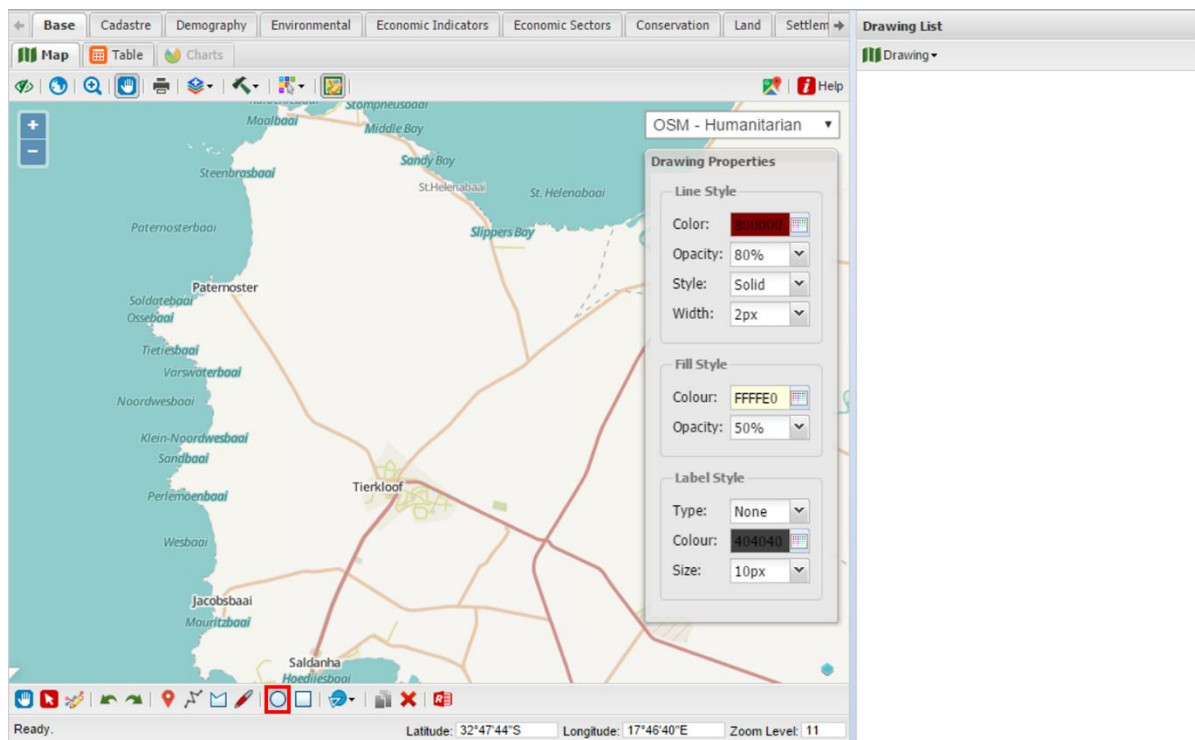
The free hand tool lets you draw line objects without clicking the vertex positions. The vertexes get drawn at very short intervals at the mouse pointer position. This is very handy when on-screen capturing needs to be done.



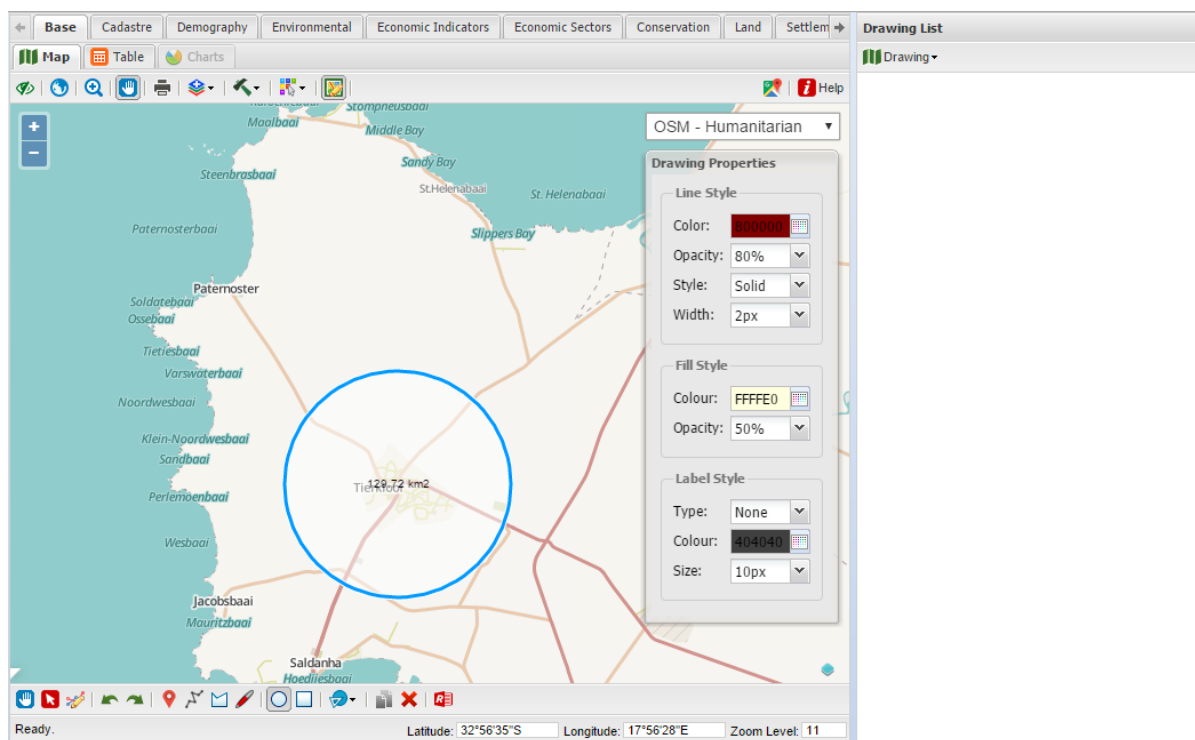
To edit, select the object and hover mouse over vertex to be moved, click on it, and drag.

9 Circle/Rectangle

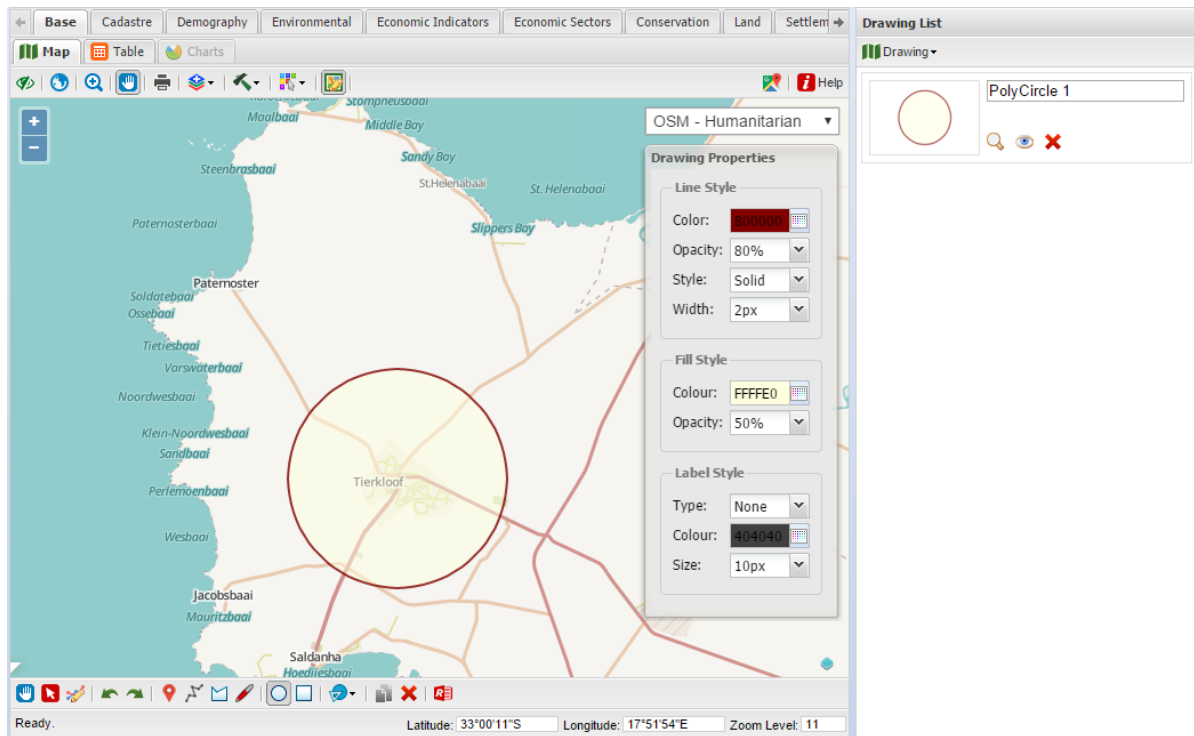
The drawing tools menu has two polygon shapes, that of a circle and rectangle. To start either click on the circle or rectangle.



To draw a circle, click in the middle of the desired circle and move your mouse cursor towards the edge of the screen to the desired size. The radius of the circle is displayed in the middle of the polygon. The rectangle is draw from the top left corner.

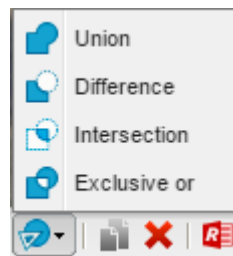


Left click to save polygon, which will appear in the drawing list.

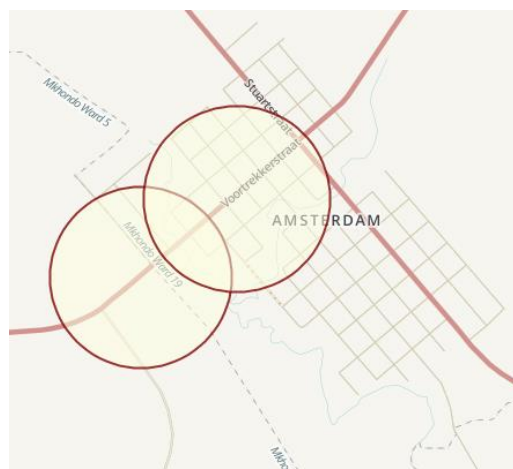


10 Boolean operations

Boolean operations are useful to create new polygon from existing polygons. The Boolean operations can be accessed by clicking on the Boolean operations dropdown.



To start first select the two polygons you would like to perform Boolean operations on.



After selecting the two polygons, and you want to "Union" the two polygons click on the "union" button (A+B).



After selecting the two polygons, and you want to "subtract one from another" the two polygons click on the "difference" button (A-B).



After selecting the two polygons, and you want to "see the intersect" between the two polygons click on the "intersection" button.

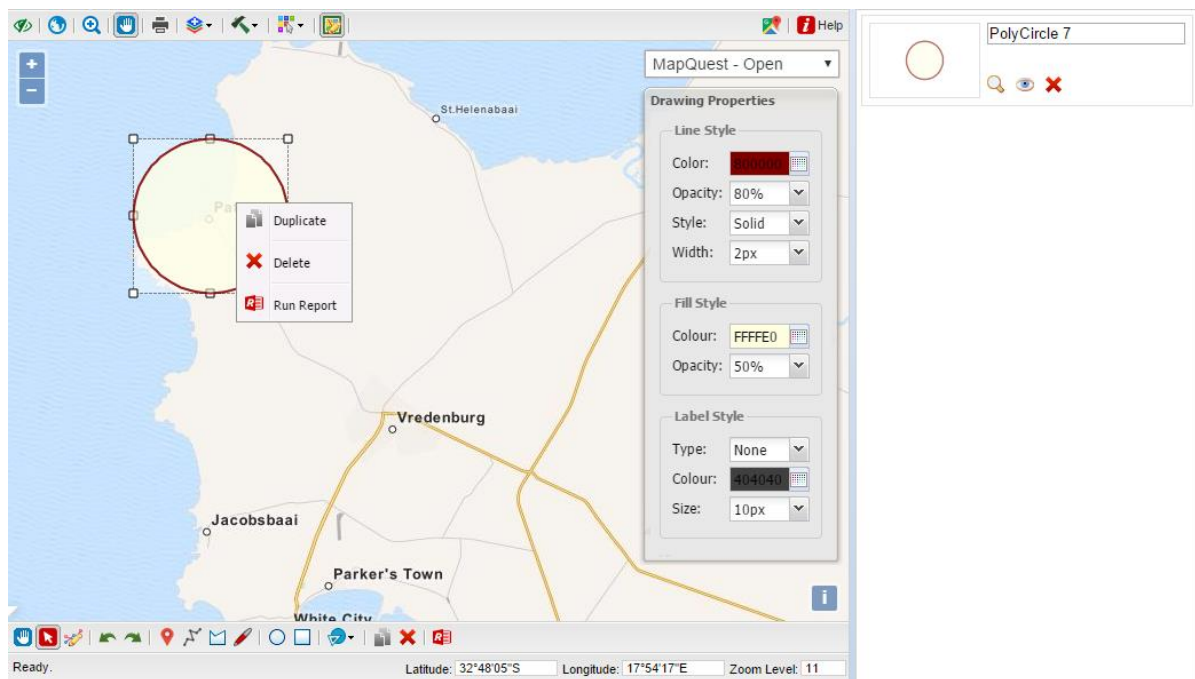


After selecting the two polygons, and you want to "subtract the common/shared area" between the two polygons click on the "exclusive" button.

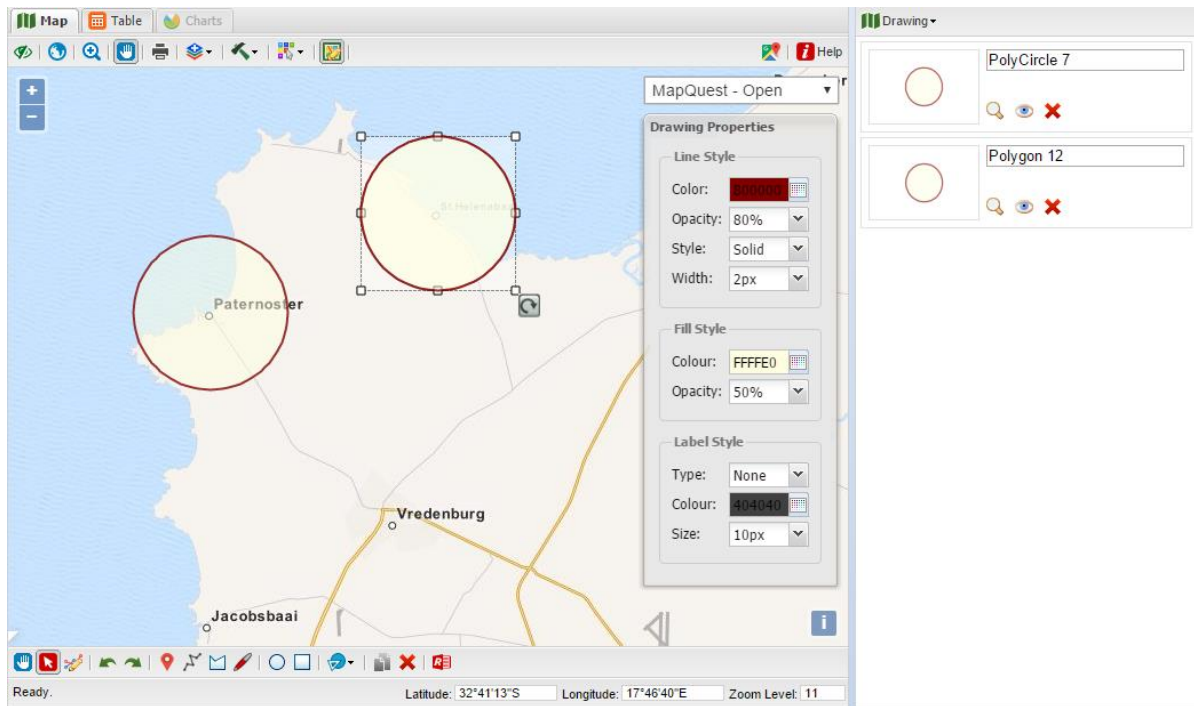


11 Duplicate

Select a feature and click on the Duplicate button or alternatively right click and select the Duplicate button.



After the duplicate is made the feature can be moved and edited by selecting it.



12

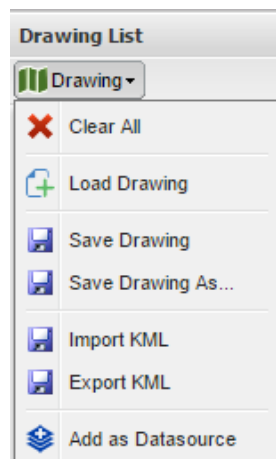
Delete



Select a feature and click on the delete button.

Saving and exporting drawings:

Once finished, the user can save the drawing in his personal user library. You can also export your drawing as a KML or import a KML to your workspace.



You can select each individual drawing from the drawing list. You can zoom to the drawing by clicking on the magnifying glass, switch the drawing on and off, delete the layer and change the name of the drawing.

