

# CoGo QGIS plugin user manual

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## Introduction

### Plugin Versions

The plugin has multiple versions in the git repository. In order to check which version exist users should look at [https://github.com/kartoza/parcel\\_plugin/releases](https://github.com/kartoza/parcel_plugin/releases)

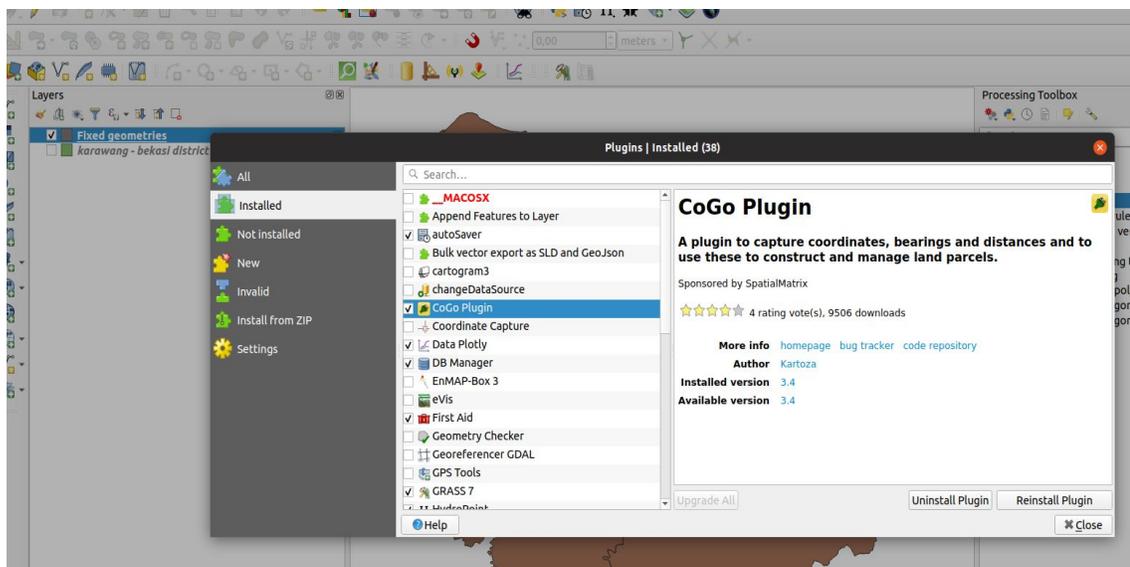
It is always encouraged to use the latest version available from QGIS plugin manager. If the latest version in QGIS has got bugs or features that are not working or were previously working then you can revert to the previous version by downloading it from the link given above.

The parcel plugin is not currently in development but we welcome any funders to help us optimise it for better functionality. Checkout our repo link to see features which are on our wish list to add to the plugin.

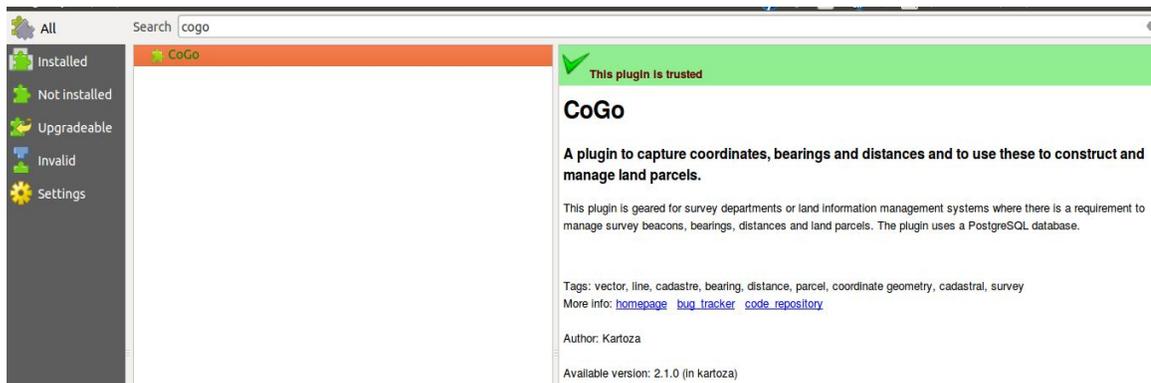
## Installing in QGIS 3

(was originally called the SML surveyor plugin, or parcel\_plugin)

1. Navigate to the plugin manager in QGIS



2. Click the **All** tab and search for the plugin **CoGo**. Then you will see the CoGo plugin in the list of plugins that you can install.



3. Install it and you will see this toolbar that the plugin added



## QGIS Versions

The plugin is available in QGIS version < 2.99 and also version greater than 3.00. For users using the QGIS versions < 2.99 the plugin will work but if you encounter any bugs they will not be fixed because we encourage users to migrate to the latest LTR version of QGIS. The current LTR version is 3.4

## Install PostgreSQL and Create a spatial database

**PostgreSQL** is one of the most popular open source databases. In order to use the parcel plugin it is assumed you have prior experience in setting up a database. If you haven't used PostgreSQL database you can download it from [Install database](#).

To create a database you can follow the instructions from [create database](#)

The parcel plugin is to be used with the PostgreSQL and PostGIS version greater than 9.6 and 2.3 respectively. Because the plugin is database dependent some functions will not work with older versions of PostgreSQL/PostGIS.

## Connecting to the parcel database

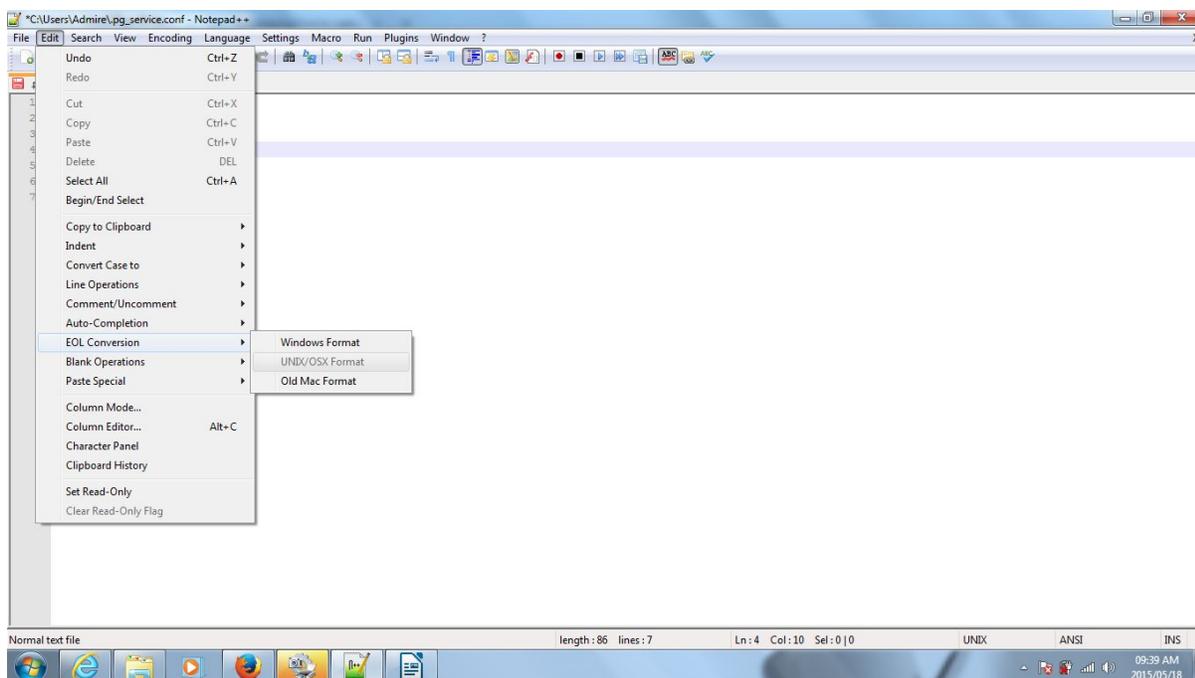
### Using Service Files to set up database connections in windows

Opening QGIS projects that are shared between multiple people can easily be done by using [pg\\_service.conf](#) which is a PostgreSQL service connection definition that any client can use, including QGIS. In windows setting up a pg\_service.conf file is done differently than on linux. Install notepad++ or a special text editor on windows machine.

1. Open notepad ++ and type the information regarding your connection details.

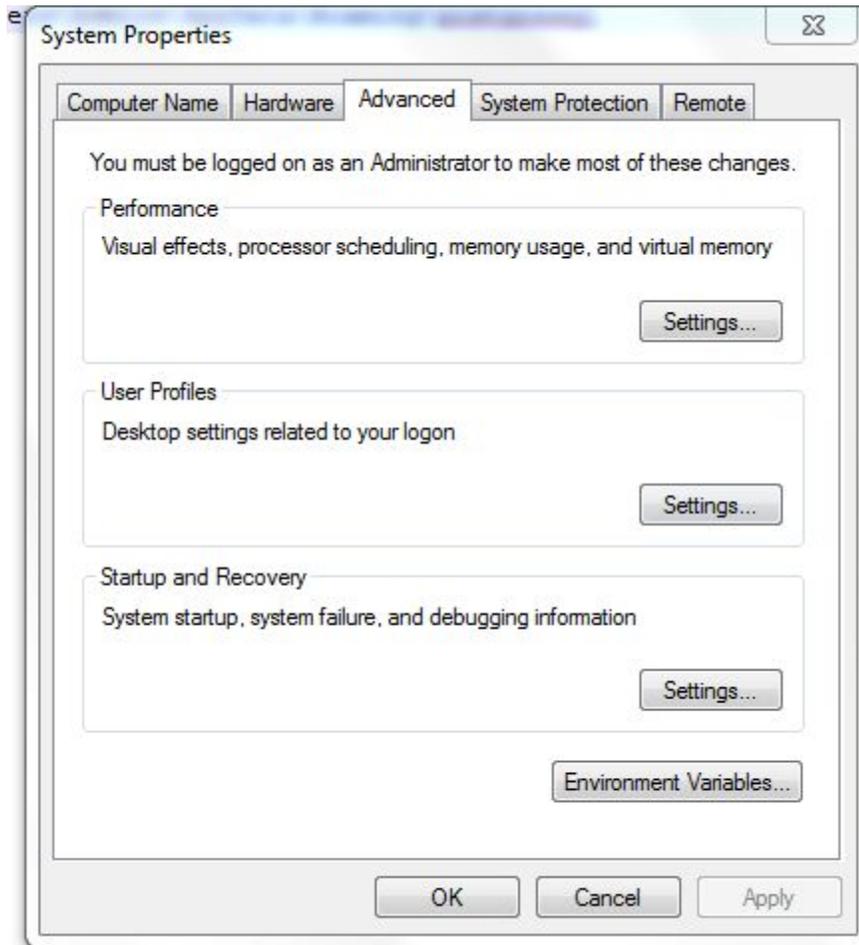
```
[sm]
dbname=gis
user=docker
port=25432
password=docker
host=localhost
```

2. Change the format of the text file to unix like by clicking on Edit and choose EOL conversion and choose UNIX/OSX format as shown below:

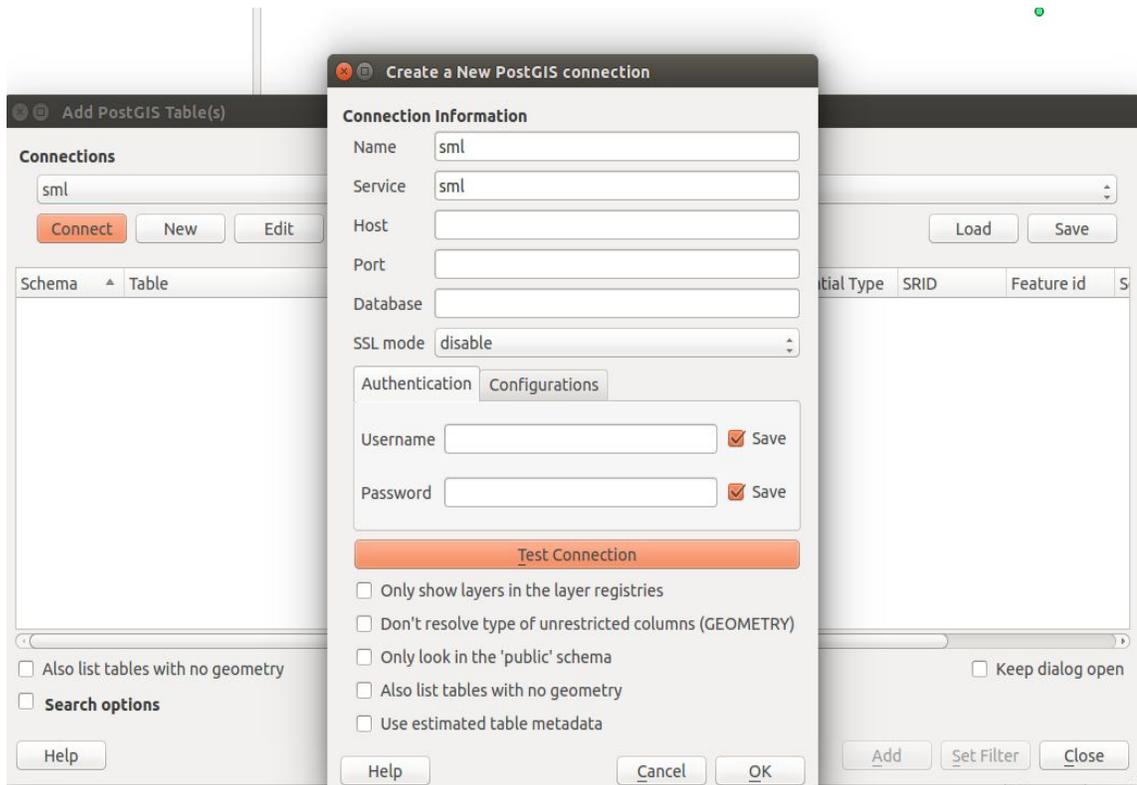


3. Save your file into C:\Users\yourname\AppData\Roaming\postgresql and save the file as pg\_service.conf

4. Click on the start menu and type system and then choose edit system environment variables



5. Choose edit system environment. Click on new and enter the following:  
Variable name: PGSYSCONFDIR  
Variable value: C:\Users\yourname\AppData\Roaming\postgresql
6. Click of and exit system environment variables.
7. Open qgis and click on the pg database connection. Define a new connection by entering the service name and name of your connection.



8. Save your connection and you are now ready to open your QGIS projects without changing the passwords.
9. This implementation uses two databases. Repeat step 1 and 7 to define another service definition that connects to another database. The database are differentiated based on the UTM zones.

## Using Service Files to set up database connections in windows

Creating a service file in unix is slightly easier than windows. You can read the following articles that explain how to do it properly.

[service file](#) or [pg service](#)

## Using the plugin



The plugin icons have the following descriptions

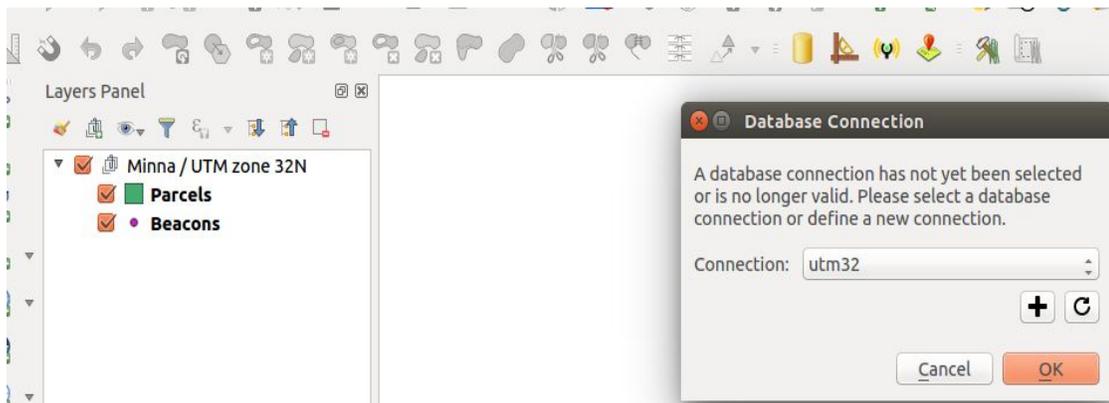
1. Select Database Connection
2. Manage Bearings and distances
3. Manage Beacons
4. Manage Parcels

### Create database connection using database manager icon

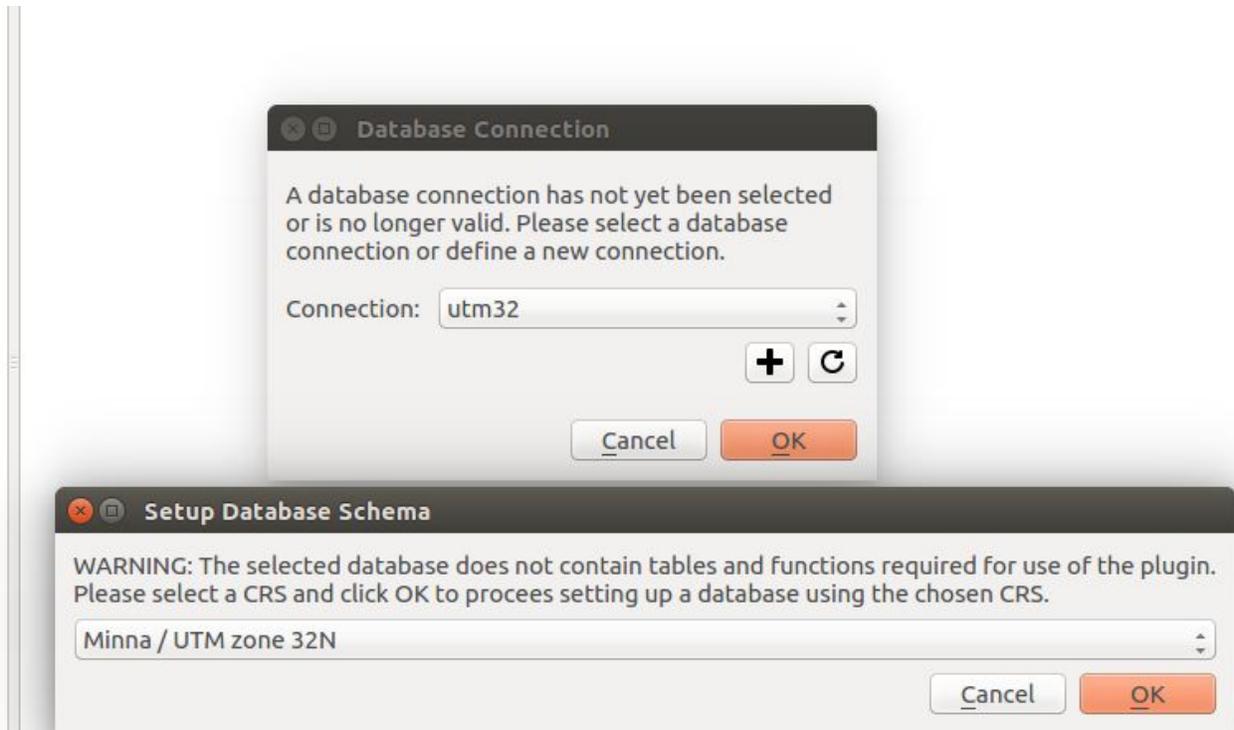
If you are connecting to your own database or an existing enterprise database that has already been set up, then continue with this section. The plugin requires a user to create a database or to use an existing database that have been created.

**NB:** Use **Icon 1** to achieve this task

1. Create an empty postgres database outside QGIS using the tools mentioned in [Install Postgres and Create a spatial database](#). You can also use an existing database if you have created one before.
2. Click on the **database icon** on the plugin toolbar. This will allow you to define connection details to your database that you will be using. If you have a database that you have already been using in QGIS it will show up here provided you had already registered it with the **Add PostGIS Layers** in the **Data Source Manager**



3. Proceed to click **OK**. The plugin will scan through the database to check if the tables required are already installed. If they are not installed another dialog will open up. The dialog will allow you to define a CRS of the area which you are working ie in Swellendam South Africa I would choose **UTM 34S**.



**NB:** It is recommended to use the service file method to connect to the database because you will be able to easily use the projects that ship with the plugin. These projects have useful default layer styles, field validation and composer templates.

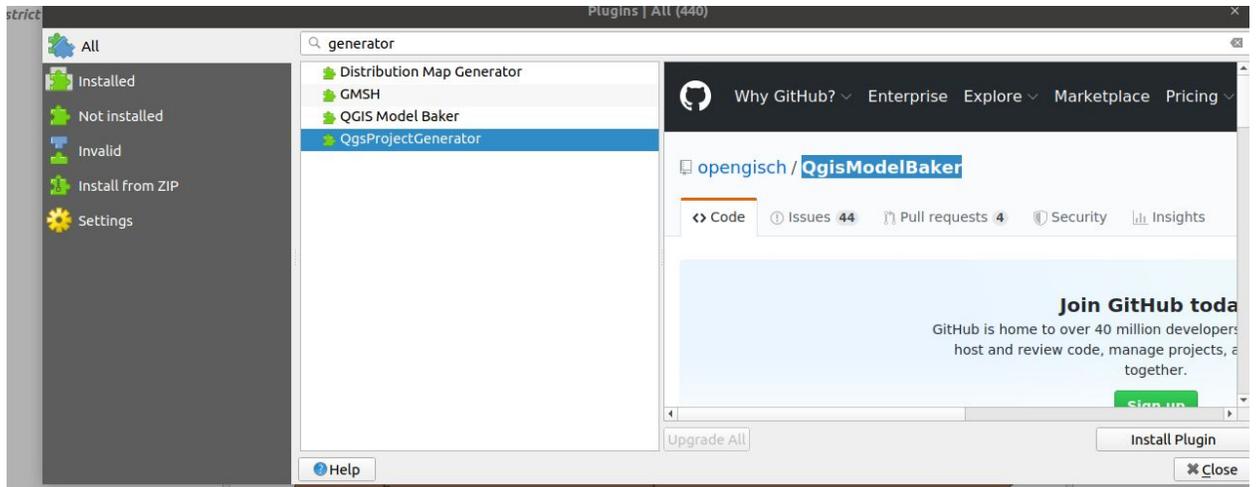
In order to use the projects within the plugin the following conditions must be met

- The database you connect to must have the parcel plugin tables - we assume you have gone through [.The CoGo plugin database](#)
- The user you connect with must be a valid PostgreSQL user and must have CRUD (create, read, update and delete) permissions on the parcel tables.

## QGIS Projects

After creating the database tables required to run the plugin you will need to load the required layers into QGIS in order to facilitate data capture. The plugin tools allows you to load the spatial tables but there is also the non spatial layers which needs to be loaded according to [Preparation](#)

1. Navigate to QGIS plugin manager and search for QgsProjectGenerator



2. Install the plugin
3. Navigate to the database menu and use the project generator.

**Generate Project** ✕

Source PostGIS

**PostgreSQL**

Host localhost

Port [Leave empty to use standard port 5432]

Database Database Name

Schema [Leave empty to load all schemas in the database]

User Database Username

Password [Leave empty to use system password]

Generate schema with superuser login from settings (postgres)

? Help ✕ Cancel Create

4. Enter the name of your database and proceed to generate the project.

5. Save the QGIS project loaded in QGIS to a preferred destination.
6. Proceed to navigate the layers.

### Loading beacons and parcels

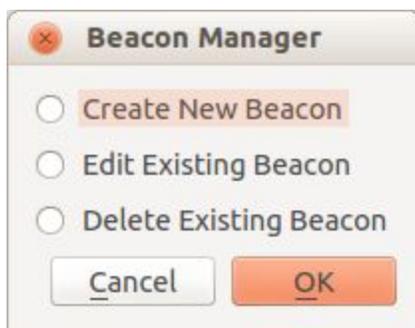
Click on any of the parcel plugin tools and the Beacons and Parcels layers will load into QGIS. The layers are automatically added to QGIS in a layer group which specifies the CRS in which the database was created against. All layers added to QGIS are active by default and will zoom to an existing feature if it has been captured.

We suggest you save your project and open it again each time you want to continue working on beacons and parcels.

### Capturing beacons via computation tables with the “Manage Beacons” Tool



Use this to add, edit or delete beacons



#### *Create New Beacon*

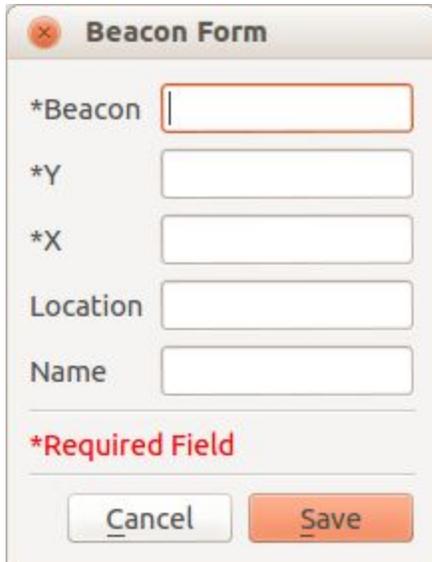
This is the main form for capturing computation sheet records or for capturing the principal beacon on a SG plan. As soon as you click OK, the beacon will appear on the canvas.

**Beacon:** unique beacon ID

Y, X: coordinates in the units of your CRS (e.g. UTM34 on Minna datum (EPSG: 26331)). They MUST MATCH the CRS defined in the database (which is also the layer CRS you will see in layer properties)

Location: Location of survey

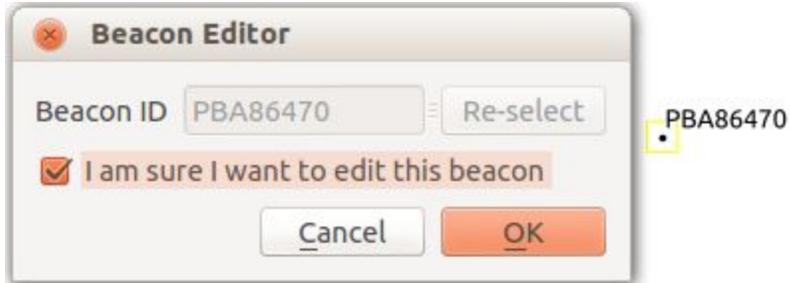
Name: Name of data capture operator



A dialog box titled "Beacon Form" with a close button (X) in the top-left corner. It contains five input fields: "\*Beacon" (with an asterisk indicating it is required), "\*Y", "\*X", "Location", and "Name". Below the fields is a red asterisk and the text "\*Required Field". At the bottom are two buttons: "Cancel" and "Save".

#### *Edit Existing Beacon*

Click on the beacon you want to edit and you will be able to edit any of its fields. If you want to move a beacon, you need to edit its coordinates using this tool. Do NOT move it by hand (= do NOT move the point = do NOT edit the geometry)



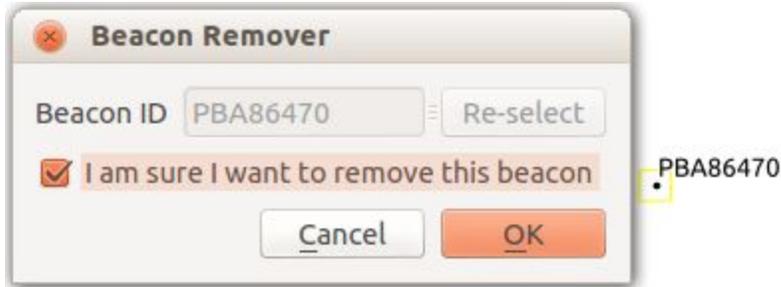
A dialog box titled "Beacon Editor" with a close button (X) in the top-left corner. It contains a "Beacon ID" field with the value "PBA86470" and a "Re-select" button. Below this is a checked checkbox with the text "I am sure I want to edit this beacon". At the bottom are two buttons: "Cancel" and "OK". To the right of the dialog box, the text "PBA86470" is displayed next to a small yellow square icon.

#### *Delete Existing Beacon*

If the beacon you want to remove is part of a parcel you will be warned.

If it was defined by a bearing and distance entry you will be warned.

Otherwise, you will be allowed to delete it.



## Capturing Beacons with the “Bearing and Distance” Tool



If you do not have a computation sheet but only have the survey plan (layout) with bearings and distances, then use this tool to capture beacons. This tool performs the ‘computation’, replacing the need for a computation sheet.

### *Preparation*

**Before capturing bearings and distances**, the “**survey**” table must be populated with all the survey (= layout = plan) numbers that are going to be used. For each plan number, you will also need to choose the following from dropdowns:

- “scheme”. The schemes to be used must exist in the “schemes” table.
- “ref\_beacon”. This is the reference beacon described on the plan. i.e. the only beacon whose coordinates are known. This must be captured first using the Beacons tool. It is the vital starting point for the computation of any other beacons on the plan.

	id	plan_no	ref_beacon	scheme
0	1	YE125	PBA82421	Olusegun Obasanjo Hilltop G...
1	2	AB1129	PBA86809	Olusegun Obasanjo Hilltop G...

Click on the Bearing and Distance Tool button in the Toolbar.

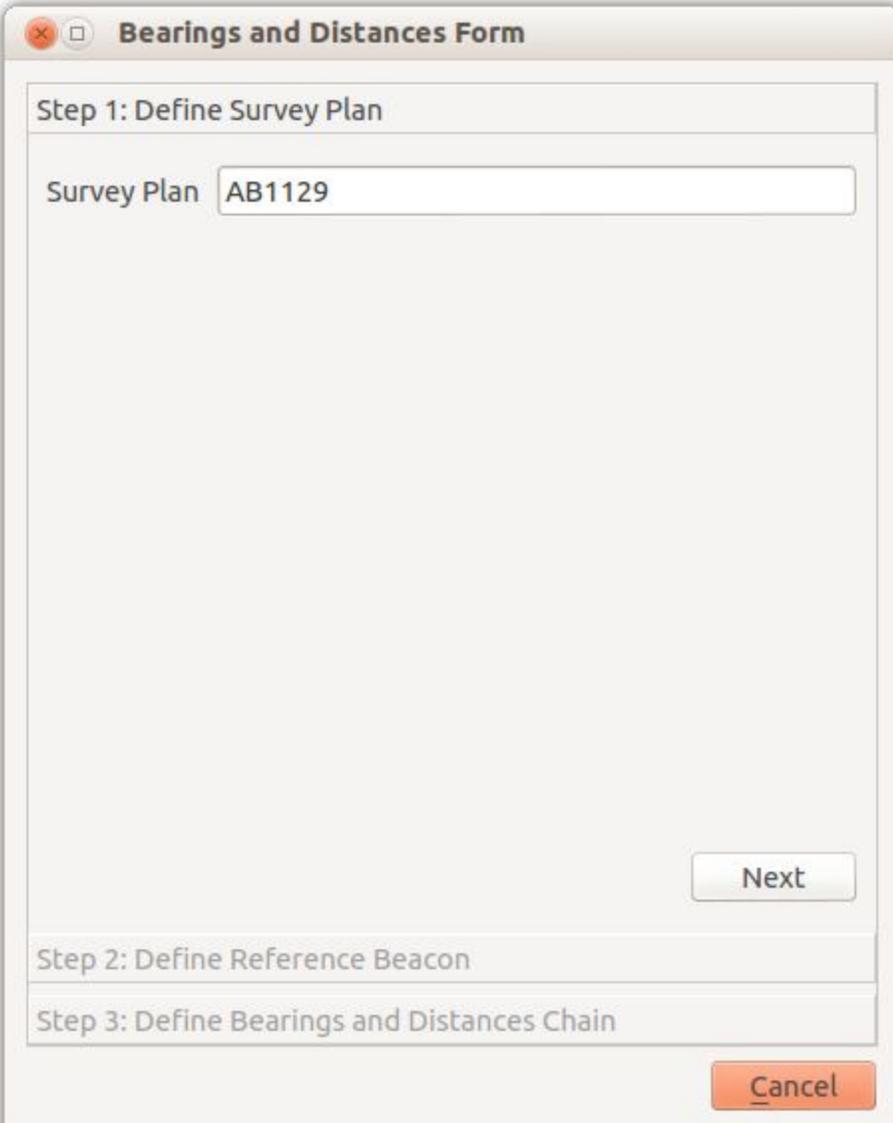
Start entering the Plan number. It will autocomplete since it already exists in the survey table.

•PBA86444

•PBA86819

•PBA86820

•PBA86809



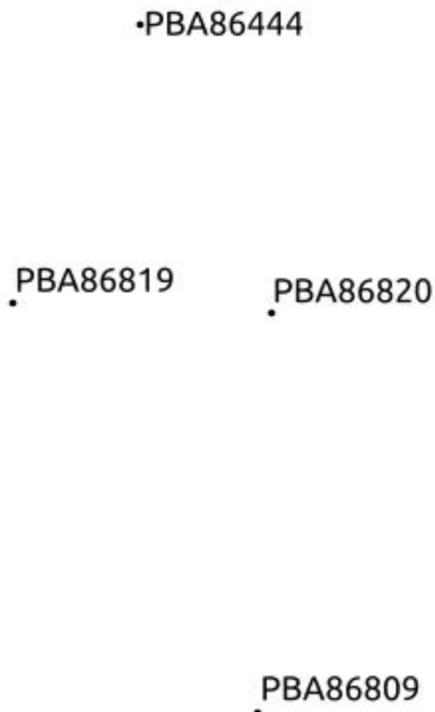
The image shows a software dialog box titled "Bearings and Distances Form". It has a standard window header with a close button (X), a maximize button (square), and the title text. The dialog is divided into three steps, each in a separate section with a light gray background and a thin border:

- Step 1: Define Survey Plan**: This section contains a label "Survey Plan" followed by a text input field containing the value "AB1129".
- Step 2: Define Reference Beacon**: This section is currently empty.
- Step 3: Define Bearings and Distances Chain**: This section is currently empty.

At the bottom right of the dialog, there are two buttons: a "Next" button with a light gray background and a "Cancel" button with an orange background.

Click Next.

The reference beacon from the Plan will autocomplete.



The screenshot shows a dialog box titled "Bearings and Distances Form". It has three steps: "Step 1: Define Survey Plan", "Step 2: Define Reference Beacon", and "Step 3: Define Bearings and Distances Chain". In Step 2, the "Reference Beacon" field contains the text "PBA86809". At the bottom, there are "Back", "Next", and "Cancel" buttons.

Click Next again. Then Click 'Add Link'.

Enter the following:

- *From* Beacon (it will autocomplete)
- *To* Beacon. This doesn't exist yet, so type it in completely.
- Bearing. In DECIMAL DEGREES. These are the bearings written on the plan for the link you are creating. (clockwise from north; north = 0 degrees). Ensure you convert accurately from DMS (degrees minutes seconds) on the plan, into DD (decimal degrees). If you're not sure, there is a spreadsheet in the plugin directory that contains the formula.
- Distance. IN THE UNITS OF YOUR CRS (likely METRES).

PBA86474  
•PBA86444

PBA86819      PBA86820

PBA86809

**Bearings and Distances Form**

Step 1: Define Survey Plan

Step 2: Define Reference Beacon

Step 3: Define Bearings and Distances Chain

**Link Form**

Bearing: 272.567

Distance: 30

From: PBA86809

To: PBA86810

Location:

Surveyor:

Buttons: Add Link, Edit Link, Delete Link, Back, Finish, Cancel, Save

Click Save

PBA86474  
PBA86444

PBA86819 PBA86820

PBA86809

The screenshot shows a software window titled "Bearings and Distances Form". It is divided into three steps: "Step 1: Define Survey Plan", "Step 2: Define Reference Beacon", and "Step 3: Define Bearings and Distances Chain". The current step, Step 3, contains a text area with the text "272.567° and 30.0m from PBA86809 to PBA86810". Below this text area are three buttons: "Add Link", "Edit Link", and "Delete Link". At the bottom of the window are "Back", "Finish", and "Cancel" buttons. A smaller dialog box titled "Link Form" is overlaid on the main window. It contains six input fields: "Bearing", "Distance", "From", "To", "Location", and "Surveyor". Below these fields are "Cancel" and "Save" buttons.

Once you've finished (you can come back and do more later), click Cancel, then Finish. Note how PBA86810 has appeared! Now you can go and compose parcels....

PBA86819

PBA86820

PBA86810

PBA86809

You can also EDIT and DELETE links created with this tool.

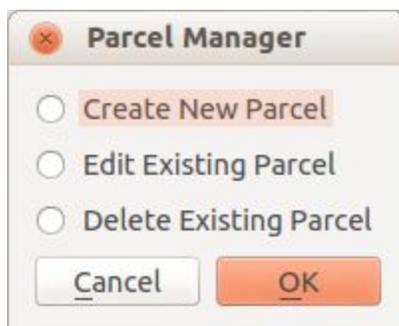
Note that several constraints are on beacons generated with bearings and distances, including:

- You won't be able to delete a beacon using the beacon tool if it was created using the bearing and distance tool, mainly because it will be part of a chain that other beacons depend on. You will have to delete the link using the bearing and distance tool, which would in turn delete other beacons that depend on it, so be careful.
- If you need to change the position of a beacon created with the bearing and distance tool, you will have to edit its bearing and distance. You will not be able to edit its coordinates using the edit beacons tool.

### Composing Parcels with the “Manage Parcels” Tool



Use this to define, edit or delete parcels. Specifically, it helps you define which beacons make up a parcel and in which order.



*Preparation*

**Before capturing parcels**, the following tables must be populated with all the values that are

going to be applied to parcels:

- schemes
- prop\_types
- local\_govt
- allocation\_cat

*Before adding parcels*

Parcel IDs and most fields describing parcels are managed in the “parcel\_lookup” table. Therefore, **first add the data describing a parcel in the “parcel\_lookup” table**, and save it. This will generate a unique “parcel\_id”, which you will type into the ‘Create New Parcel’ dialog.

If the correct style has been loaded for the parcel\_lookup table, most of the fields will have dropdowns to choose values. Complete the fields as follows:

- scheme: choose from dropdown
- local\_govt: choose from dropdown
- prop\_type: choose from dropdown
- allocation: choose from dropdown
- block: enter manually
- plot\_sn (plot serial number): enter manually
- official\_area: area of parcel, in square metres, exactly as written on the plan
- file\_number: enter manually. This will eventually become a dropdown. It is the main link to title deeds. ENTER CAREFULLY!
- deeds\_file: file name or url that will be used to retrieve the digital deeds file. Not finalised yet.
- parcel\_id: Leave (it will be auto-generated)
- available: ignore
- manual\_number: ignore

	plot_sn	available	scheme	block	local_govt	file_number	allocation	parcel_id	annual_r	prop_type	deeds_file	official_area
0	5	t	NULL	NULL	Abeokuta S...	NULL	NULL	5	NULL	Allocati...	NULL	NULL
1	3	t	Olusegun ...		Abeokuta S...	LUD11/LR...	free and ...	3	3	Allocati...	NULL	NULL
2	2	t	Olusegun ...	rwe	Abeokuta S...	LUD11/LR...	tempora...	2	9	Allocati...	LUD11L...	NULL
3	4	t	Olusegun ...	XXV	Abeokuta S...		tempora...	4	7	Allocati...	NULL	NULL
4	1	f	Olusegun ...	ads	Abeokuta S...	LUD11/LR...	parcel all...	1	8	Allocati...	NULL	NULL
5	17	t	NULL	NULL	Abeokuta S...	NULL	parcel all...	6	NULL	Allocati...	NULL	NULL
6	34	t	Olusegun ...	sfdg	Abeokuta S...	NULL	parcel all...	9	NULL	Allocati...	NULL	23456

```
gis=# select * from parcel_lookup limit 5;
plot_sn | available | scheme | block | local_govt | prop_type | file_number | allocation | manual_no | deeds_file | parcel_id | official_area | private | status
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----
842     | t         | 1      | 5      | 1          | 1         | LUD11/LC 299 | 1         | 1         |             | 1         | 2820         | t       |
2016    | t         | 2      | 0      | 1          | 2         | NG/MN/1234    | 1         | 1         |             | 2         | 1410         | t       |
MTP 116 | f         | 3      | 0      | 1          | 2         | NG/MN/56116   | 1         | 1         |             | 3         | 4500         | t       |
5863    | f         | 4      | 0      | 2          | 2         | NG/MN/5863    | 1         | 1         |             | 4         | 2860         | t       |
(4 rows)
```

During data capture setting the available to false will result in the corresponding parcel\_id for that record to be unavailable when creating a new parcel. The default value for the available column is true.

### Create New Parcel

This is where you compose a new parcel from beacons. Enter a unique parcel ID. As you type, the ID will autocomplete from matching parcels that have been defined in the “parcel\_lookup” table.

Click the ‘Start’ button.

Then click on the beacons that make up a parcel. It does not matter which one you start with but they must be in order.

If a beacon you want to add does not exist yet, click the ‘New Beacon’ button. Add the beacon from a computation sheet record. When done, it will return to the Parcel form to let you carry on defining the parcel.



**Parcel Form**

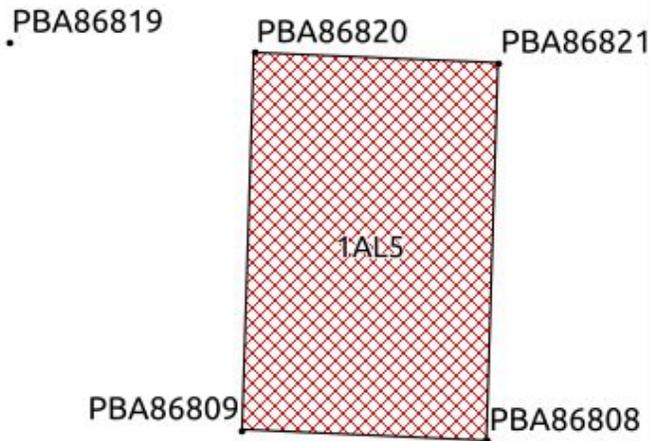
Parcel ID

Beacon Sequence New Beacon

Start PBA86808  
 Stop PBA86809  
 Reset PBA86820  
 PBA86821

Cancel Save

Then click save and the parcel will draw and the dialog will clear, ready to capture the next parcel.



**Parcel Form**

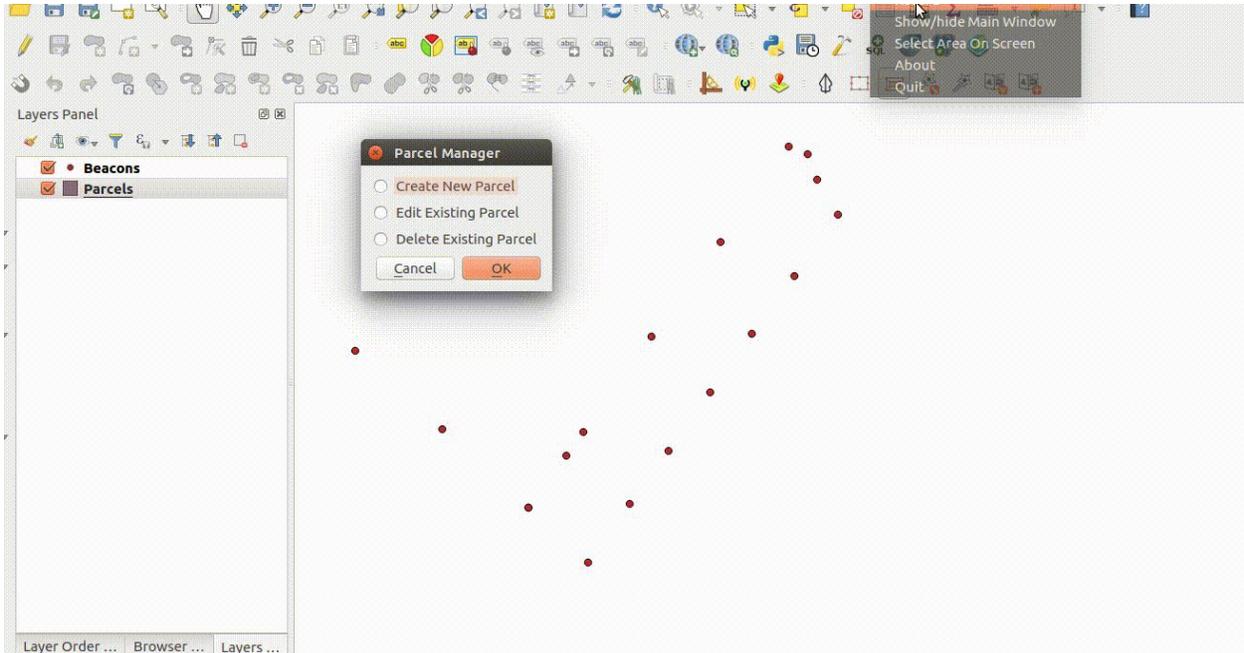
Parcel ID

Beacon Sequence New Beacon

Start  
 Stop  
 Reset

Cancel Save

Note: When a parcel\_id is linked to a parcel, it becomes unavailable. i.e. one record in "parcel\_lookup" can describe only ONE parcel.

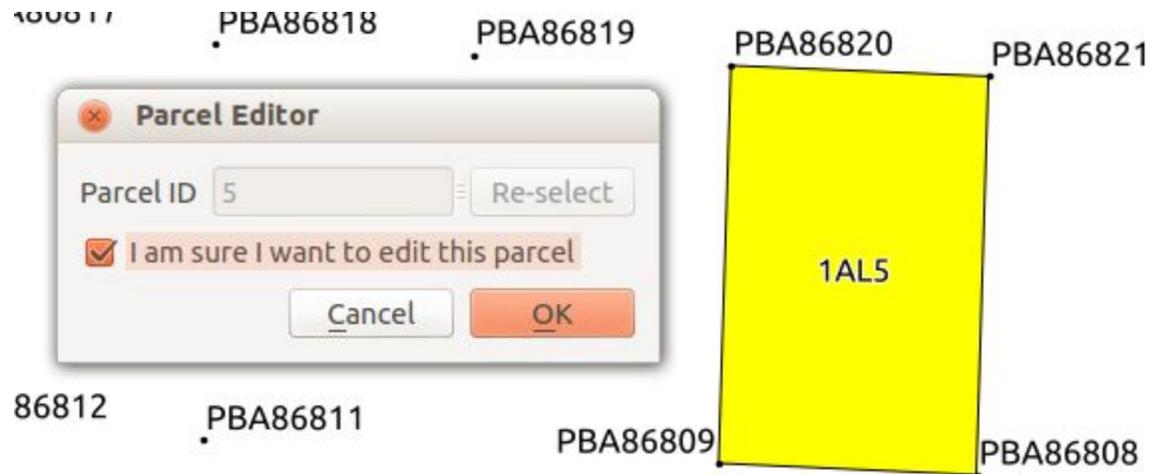


### *Edit Existing Parcel*

Editing allows you to do any of the following:

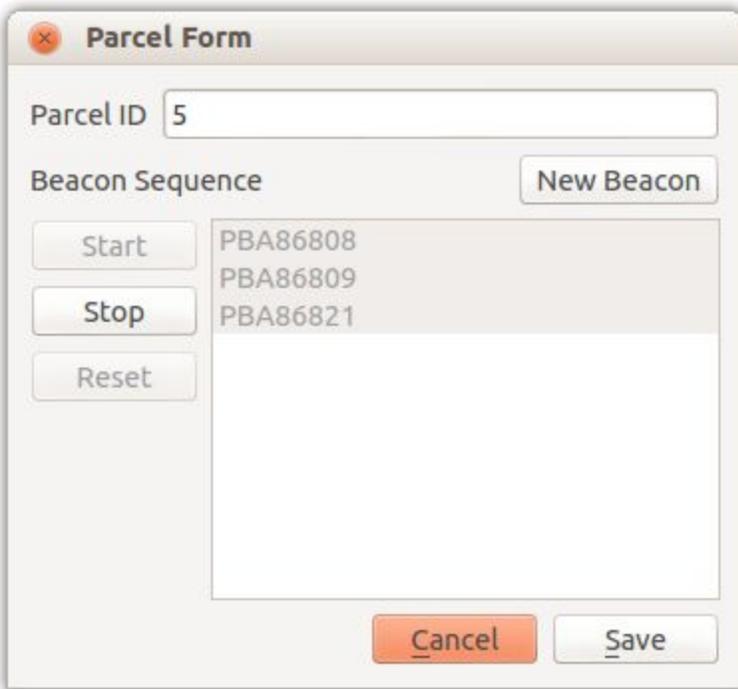
- choose a different available parcel\_id
- add beacons to the parcel
- remove beacons from the parcel
- change the order of beacons

Click on a parcel to select it.

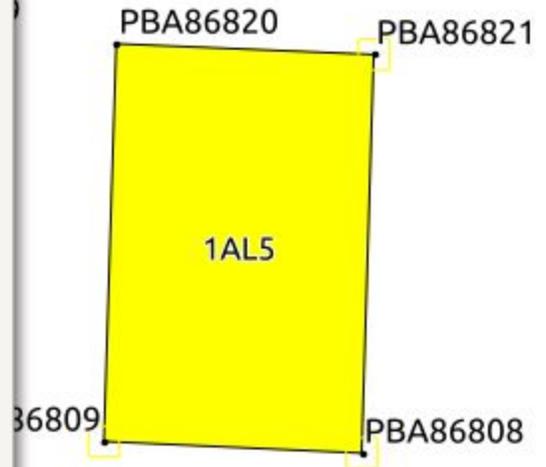


Click Start then click on beacon in the map to add or remove them from the list. Here PBA86820 was clicked and has been removed from the list.

To change the order, click Reset and start the list again.

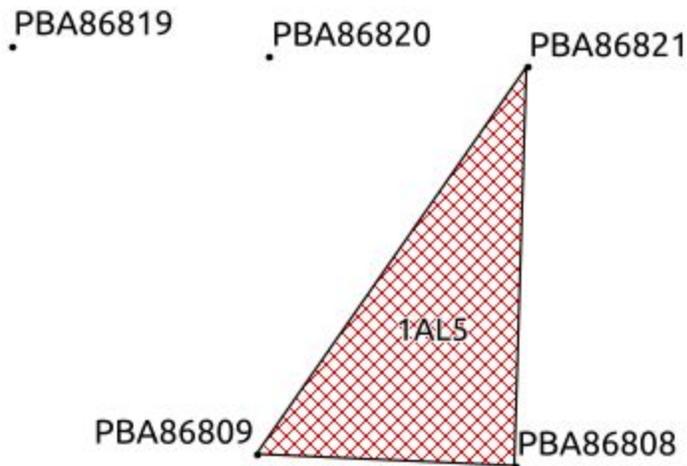


The image shows a software dialog box titled "Parcel Form". It has a close button (red X) in the top-left corner. The "Parcel ID" field contains the number "5". Below this is a "Beacon Sequence" section with a "New Beacon" button. On the left side of the beacon list are three buttons: "Start", "Stop", and "Reset". The beacon list itself contains three entries: "PBA86808", "PBA86809", and "PBA86821". At the bottom of the dialog are "Cancel" and "Save" buttons.



When done click Stop, then Save.

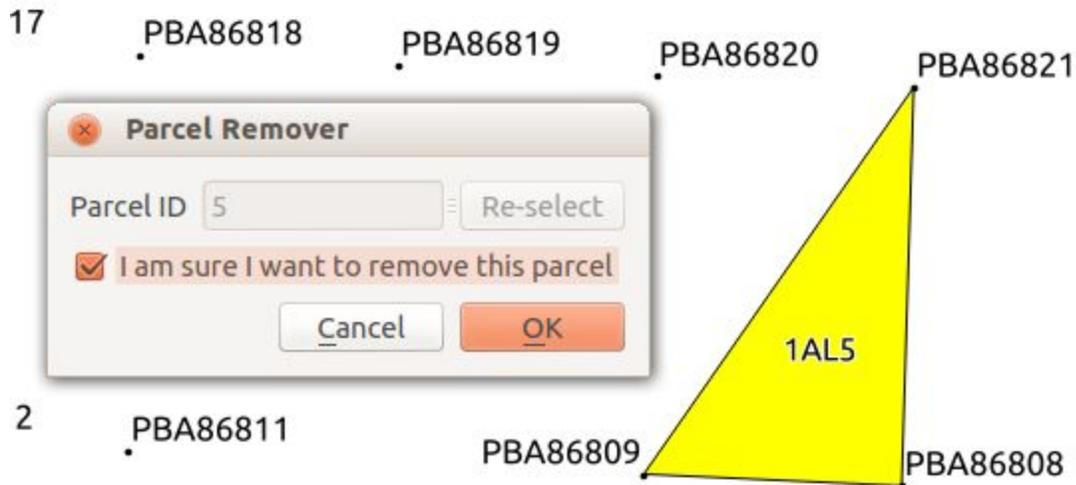
Note: Removing a beacon from a parcel does NOT delete the beacon.



#### *Delete Existing Parcel*

Just click on the parcel you want to delete, confirm and click OK.

Note: Deleting a parcel does NOT delete any beacons and it does NOT delete the parcel description from "parcel\_lookup".



## Printing survey diagrams in QGIS

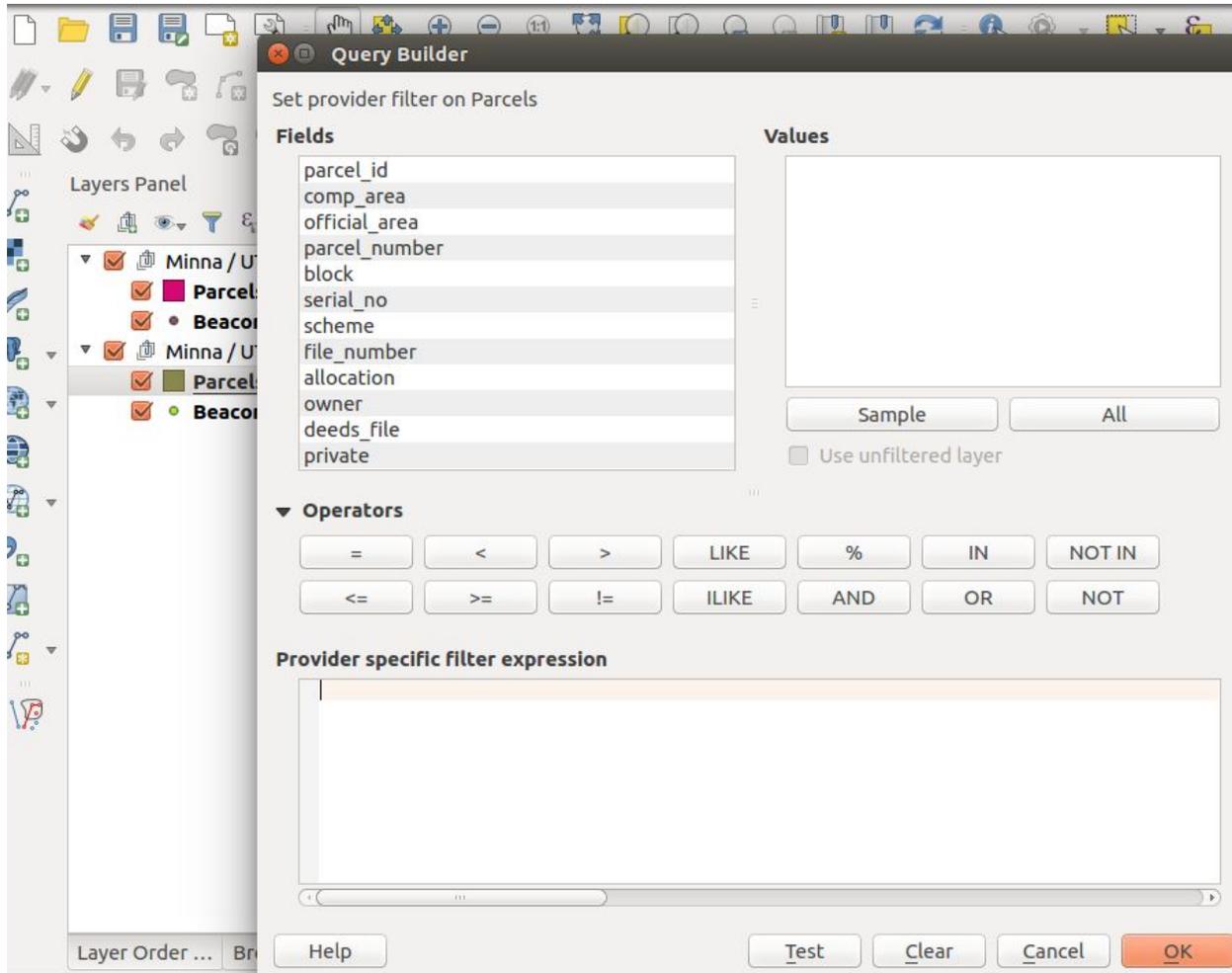
### Dependencies

- “reference\_view”. A PG View layer to prepare the reference beacon
- “beacons\_view”. A PG View layer preparing beacons
- “boundary\_labels”. A PG View layer that extracts linework from parcels and sets up labels from beardist if available. This is brought in twice, once to label distance and once to label bearing, so that these labels can be placed either side of the line.
- “derived\_boundaries”. A view containing generated parcel boundaries with derived bearing and distance fields, filtered to fill in gaps in “boundary\_labels”.
- “roadsvew”. Admire’s original roads view is lost? Any appropriate roads layer to give context to the parcel...
- “parcels”. PG materialised view layer of parcels.

### Workflow

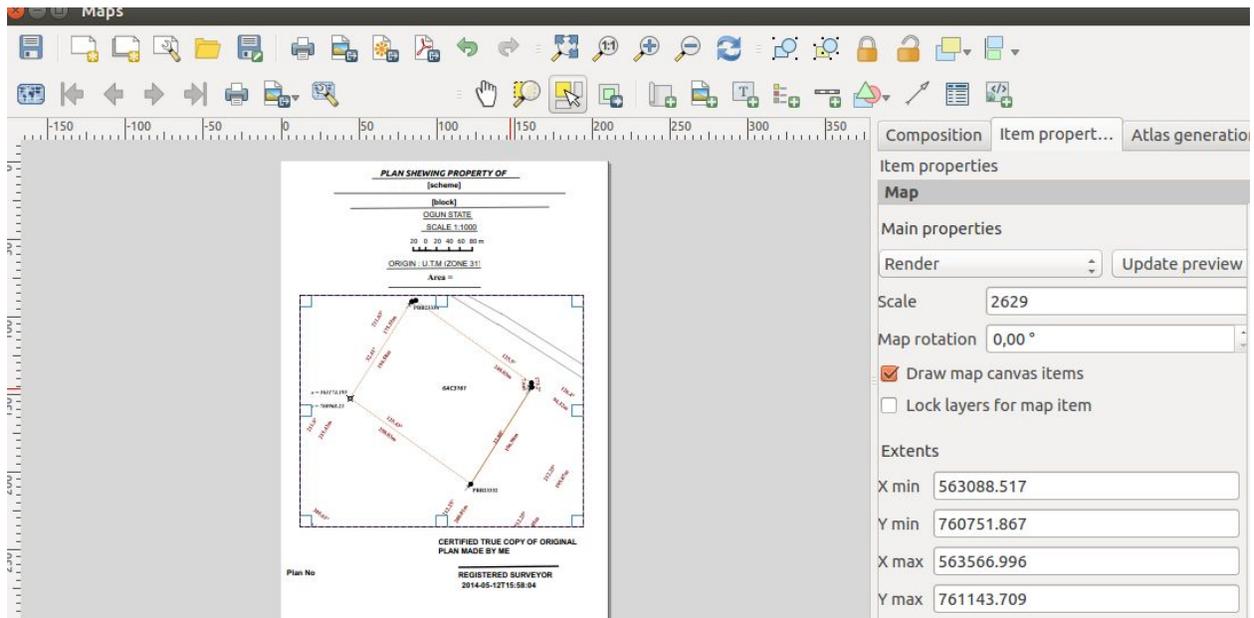
1. Open the project file in QGIS.
2. When the project has loaded, right click Parcel properties and choose filter and enter a query into the Query Builder to filter for the parcel that needs to be printed, for example:

"parcel\_id" = 3161



3. Click OK in the query builder menu and then OK
4. Zoom to the parcel. One way to find it easily is to select it via its attribute table and then zoom to selection, or simply zoom to layer extents. For the latter you might have to Update Extents in the layer properties.
5. Right click on the beacons\_intersect layer and follow steps 3 to 5 putting the same parcel\_id as for the one in the parcel layer.
6. Right click on the reference\_view layer and repeat steps 3 to 5 putting in the same parcel\_id as above.
7. Repeat for derived\_boundaries
8. In the composer manager click on the map canvas area and choose update preview and the new parcel will be on the screen. if map composer is not open then go to project, then choose composer manager then click maps and click show. and then update

preview.



9. Adjust static parts of the map template, such as some label text and some placements.

10. Be aware that some values will be populated from the parcel data, such as:

- a. scheme
- b. block
- c. timestamp
- d. area

So you will only see the final values once you preview or print the atlas.

11. When the map is satisfactory then go to menu and choose atlas and then choose export image as appropriate format, either images,svg or pdf and save file to preferred destination or print directly.

**PLAN SHEWING PROPERTY OF  
WITHIN 1.5 KM CORRIDOR**

**SCOTTS INDUSTRIES LIMITED**

OGUN STATE

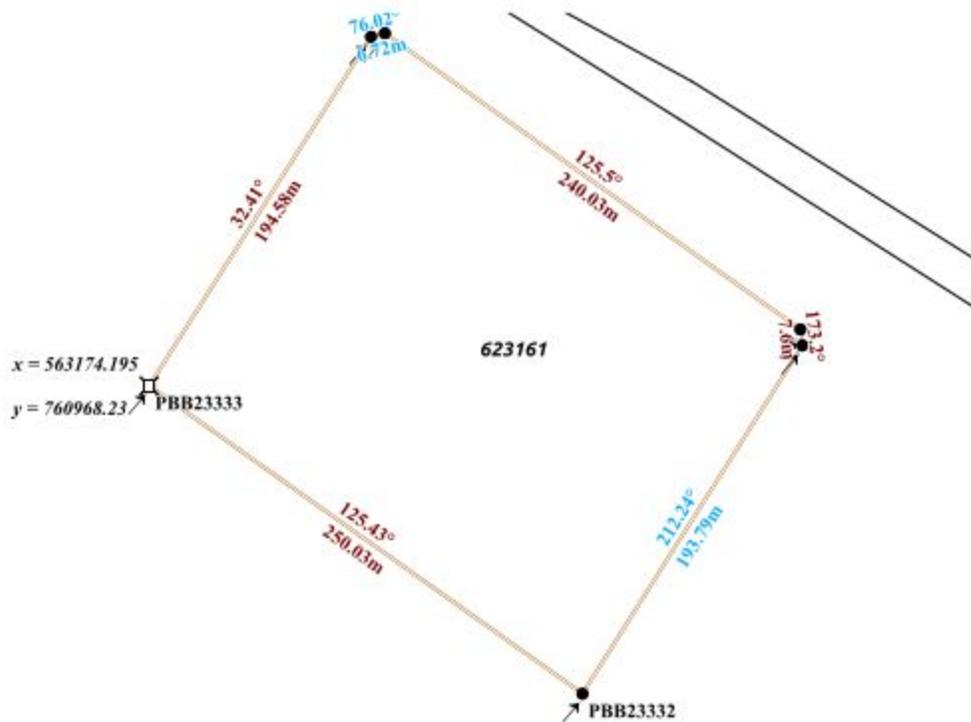
SCALE 1:1000

20 0 20 40 60 80 m



ORIGIN : U.T.M (ZONE 31)

Area = 49 739,463



**CERTIFIED TRUE COPY OF ORIGINAL  
PLAN MADE BY ME**

Plan No

**REGISTERED SURVEYOR**

2014-09-19T13:48:35

## Example Capture Survey Diagram

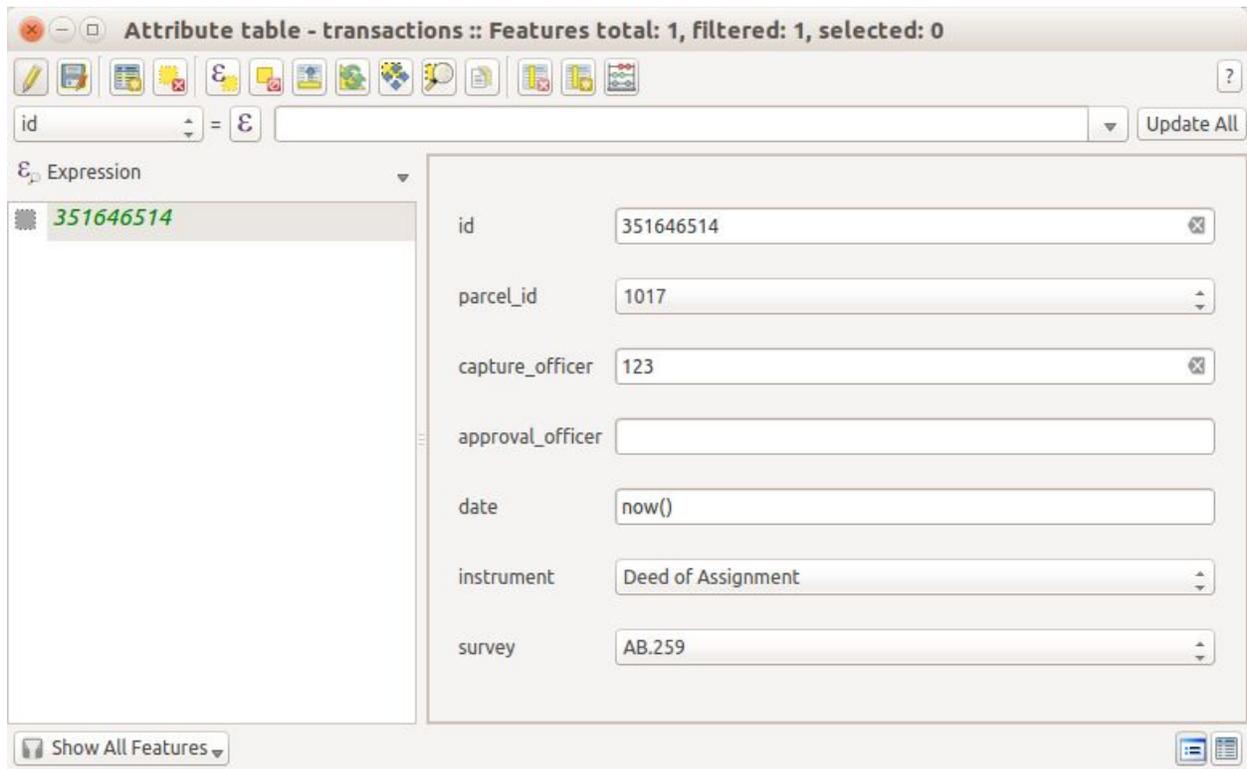
**NB:** This assumes you have installed the plugin from QGIS

1. In QGIS navigate to the **settings menu >> user profiles >> open active profile folder**.  
Navigate to the python folder and select parcel plugin folder.
2. Follow the instructions from [Create database connection using database manager icon](#).
3. Select **CRS:26332** that corresponds to the coordinates of the survey diagram located in the folder **data**.
4. Using DB Manager run the contents of the SQL located in **scripts/sample\_data.sql**
5. Close DB Manager and start using the plugin.
6. Click on the Manage Parcels to load the plugin layers.
7. Open the Beacons table and notice that one row has been captured already.
8. Using the instructions provided in this manual use the [Capturing beacons via computation tables with the “Manage Beacons” Tool](#) to populate the beacons.
9. Use the Survey diagram in the data folder to get the coordinates and beacon distances.
10. After capturing all the beacons proceed to create a parcel using the [Composing Parcels with the “Manage Parcels” Tool](#) .
11. You should proceed to print parcel that you have captured.

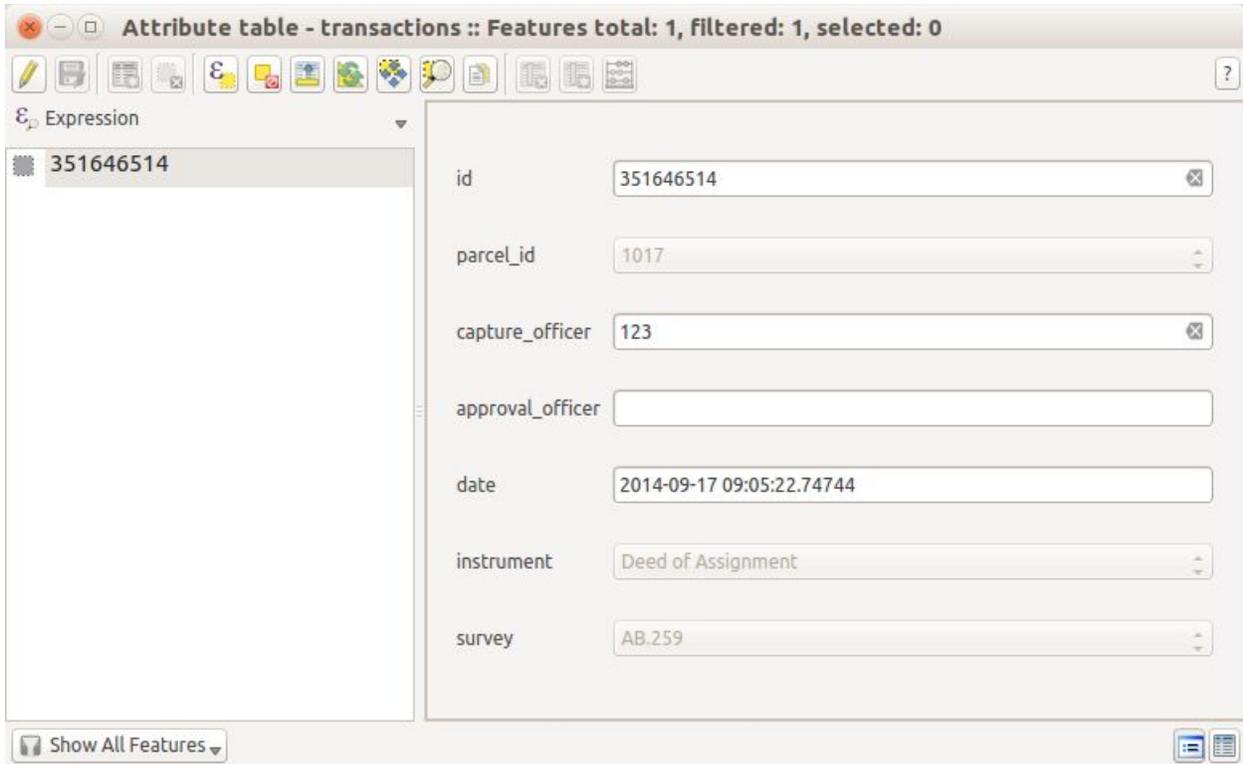
## Charting

1. Open QGIS. Load a project that has all the layers and styling normally used in cadastral data capture work. In other words, we start from a normal data capture setup, including the Parcel plugin.
  - a. Preferably open a project that has been prepared with forms and relations set up already, that will automate most of the steps below.
2. Load transactions table and open its form view. Toggle editing and enter the transaction ID.
3. Enter the survey ID and parcel ID of the parcel forming part of the application
  - a. If the parcel does not exist yet (which will be in most cases), then proceed to capture it using the procedures documented above for capturing beacons and parcels and surveys.
4. Choose the instrument
5. Enter the Capture Officer. This has to be the OneMap user ID (integer) from the “bf\_users” table in the onemap database on smlogis01.
6. Save and confirm that the save was successful.

Completed form before saving:



After saving:



## Developer notes

The plugin resides at [https://github.com/kartoza/parcel\\_plugin](https://github.com/kartoza/parcel_plugin).

1. Clone the repository or download it

`git@github.com:kartoza/parcel\_plugin.git`. Clone the repository into the plugin directory in QGIS or clone it in any path and create a soft link to the QGIS plugin directory. The plugin folder is located at `/home/\${USER}/qgis2/python/plugin`

Since the plugin is located in a github repository getting any changes will be easy as it follows git principles.

When an update has been done on the repository you need to pull the changes in your local copy of the repository. In QGIS activate the plugin called Plugin Reloader and use this to apply any changes that you have pulled into your local repository.

