HOW IT WORKS

Zones of Theoretical Visibility

CartoConsult

Capture • Process • Visualise

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Zones of Theoretical Visibility (ZTV)

Viewshed Analysis

What is a ZTV?

A ZTV (sometimes known as a ZVI) is where you can 'theoretically' see an object from a given location. These are often used by Architects, Landscape Architects, Urban and Town Planners and Environmental experts for planning applications.

A ZTV is normally the pre-requisite to a full blown Verified View production. The idea is to narrow down the number of Verified View's needed by running a Viewshed Analysis. The ZTV output is normally discussed by the planners and the client to decide which 'views' are most sensitive and then create a shortlist of Verified Views for production.

What is a Viewshed Analysis?

A Viewshed Analysis is a set of Geographical Information Systems (GIS) geoprocessing analysis tools that can be used in conjunction with digital location data to create a theoretical visibility of an object over a large area from multiple locations.

Viewshed Analysis can be run by using GIS software, such as QGIS or ArcGIS (there are others available too).

What Data?

There are two critical digital GIS datasets needed to run Viewshed Analysis:

- **Proposed object with height information (eg. New building, height of 50 meters)**
- **Digital Terrain or Surface Model (DTM/DSM)**

Where can I get this data from?

Your proposed object could be a CAD point or line file, or a GIS point or line file. Both must hold the proposed height information within its database (attributes).

The DTM or DSM will need to be either downloaded as OpenData from Ordnance Survey or the Environment Agency. If higher levels of resolution are needed then there are other suppliers, such as Bluesky, where you can purchase higher resolution data or even commission bespoke aerial surveys so your data is current to the present day.

How Do I Run a Viewshed Analysis?

For this example, we are going to run through a quick Viewshed Analysis of a proposed flood bank in Scotland using QGIS:

1. Open QGIS
2. Install the Viewshed Analysis Plug-in
3. Add your Digital Terrain Model raster and Proposed point or line file

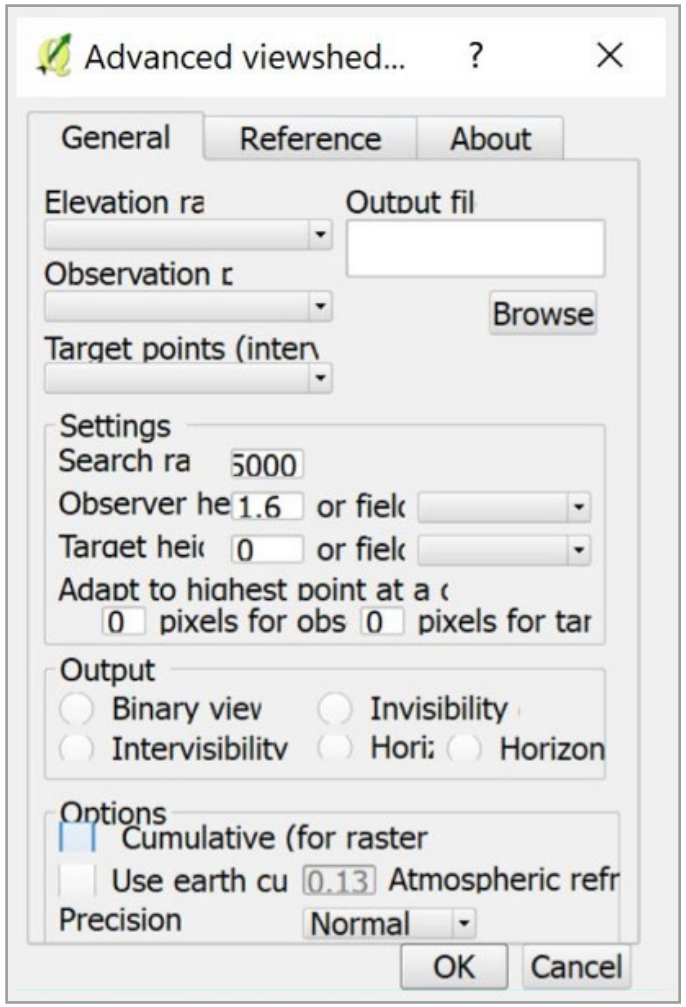

Figure 1 - Viewshed Analysis Tool in QGIS

4. Ensure your coordinate system is set to British National Grid (for UK analysis)
5. Open the Viewshed Analysis tool that you added from the plug-in repository
6. Add your various input data into the correct input fields
7. There are various advanced options you can customise, depending on the type of output you are looking for. We won't cover each of those in this tutorial
8. Run the tool!
9. The output will be a georeferenced output, that will look something like figure 3. The data has been symbolised in QGIS to show only the visible areas (green).

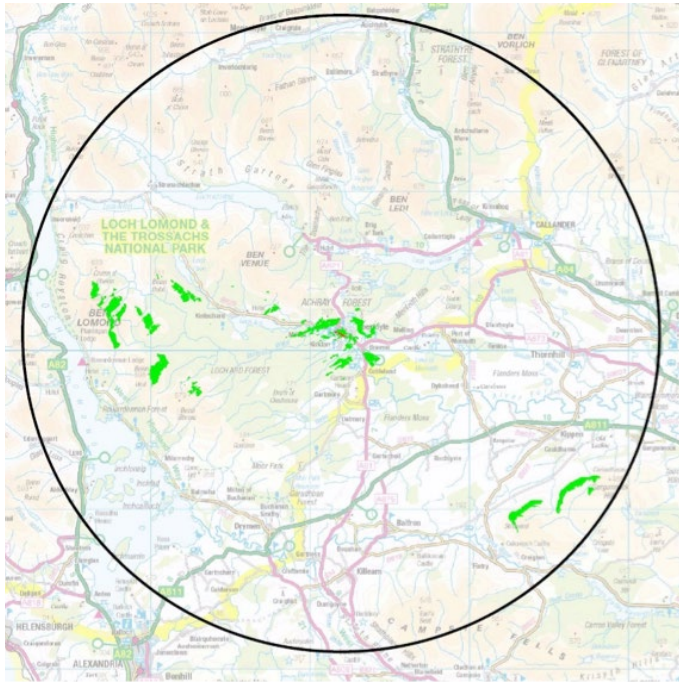

Figure 2 - Raster output in QGIS showing where the proposed flood bank is visible

3D GIS Opportunity

Figure 3 - 3D GIS software Carto3D by The Carto Group

With the latest 3D GIS technology, this type of analysis can now be run in a more 'real-world' situation, in 3D with buildings included with more reliable results and much more under-standable visualisation outputs that every stakeholder can understand.

That's all for this tutorial, and don't forget, here at CartoConsult we produce, ZTVs, Verified Views and develop 3D GIS software, so get in touch if you require any help with your planning applications.

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