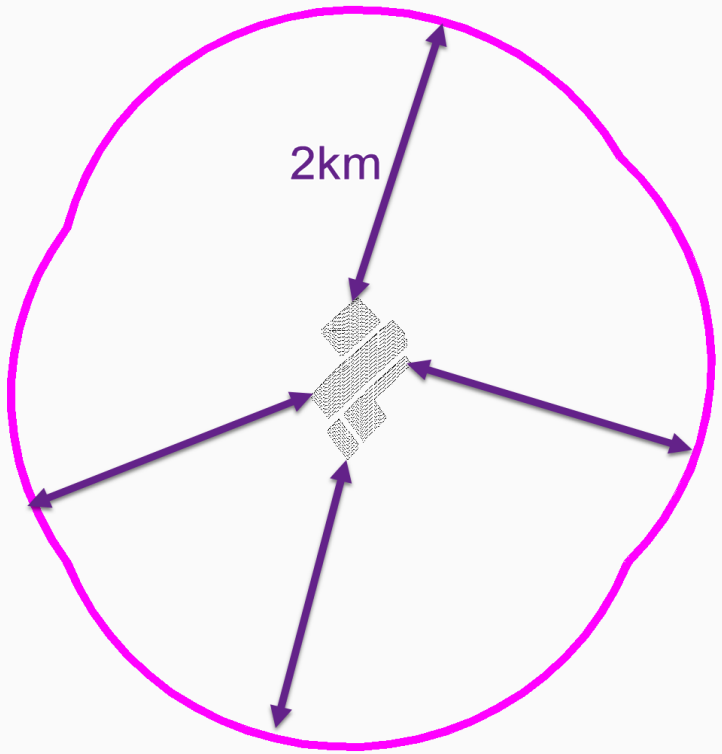
KTF SOFTWARE

Powerful & Simple CAD Solutions

ZTV Processing

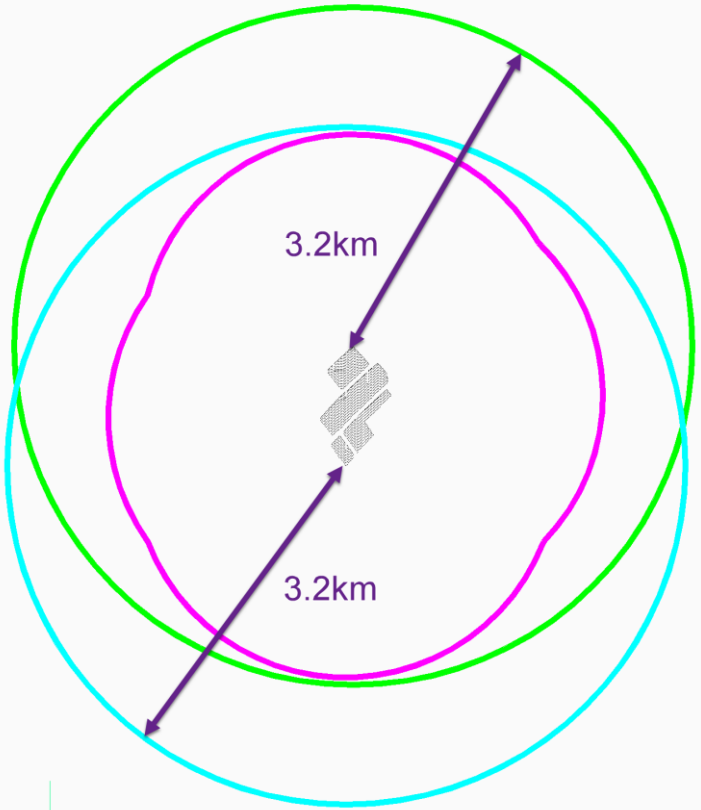
General considerations when processing a ZTV analysis with KTF ZTV Software

- Using a sample study of a solar farm, roughly of size 1100m x 750m.
- Visibility analysis extends 2km from the site.
- To cover the 2km off the site boundaries each individual target point ray extent is set to 3.2km
- Using DSM for automatic visual barrier detection



Analysis extent 2km

Target point distances need to be 3.2km to cover the analysis extent



Source data

- DTM and DSM from Defra
  - DTM: 1m grid, 15 x 15 km square, 225M points
  - DSM: 2m grid, 15 x 15 km square, 56M points
- Simple CAD drawing with the site extents

Three main tasks

- ZTV process can be divided in three parts
  - One: Preparing the DTM/DSM models
  - Two: Running the ZTV analysis
  - Three: Processing the result into delightful colors

One, Preparing the DTM/DSM models

Convert the GeoTif files into XYZ with QGIS

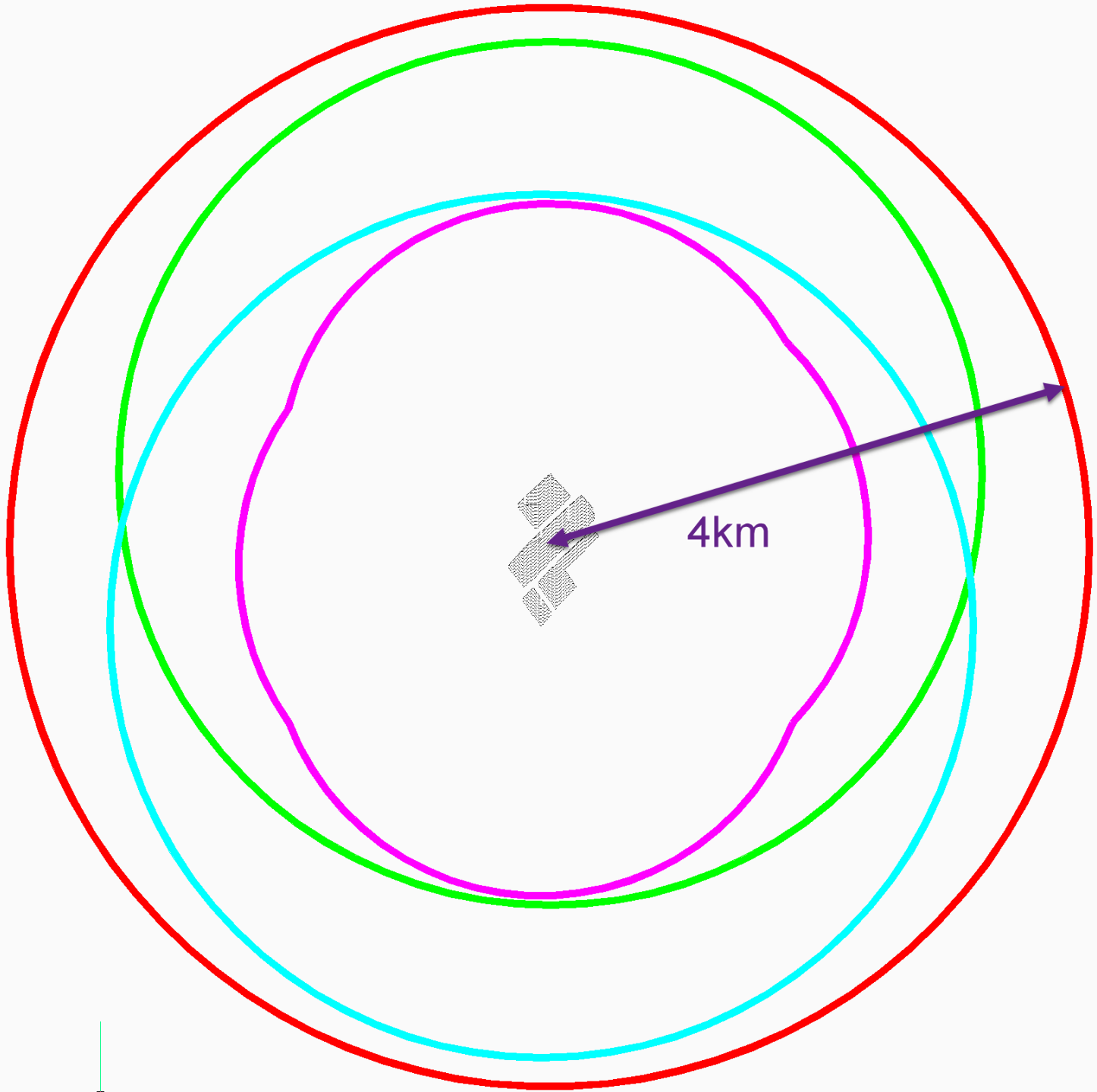
Filter the XYZ points to within a 4km from the center of the site*

- Draw a 4km radius circle centered on the site
- Use '**KTF>File Utilities>.xyz coordinate files>Merge and Extract**' on both of the xyz files with the 4km circle

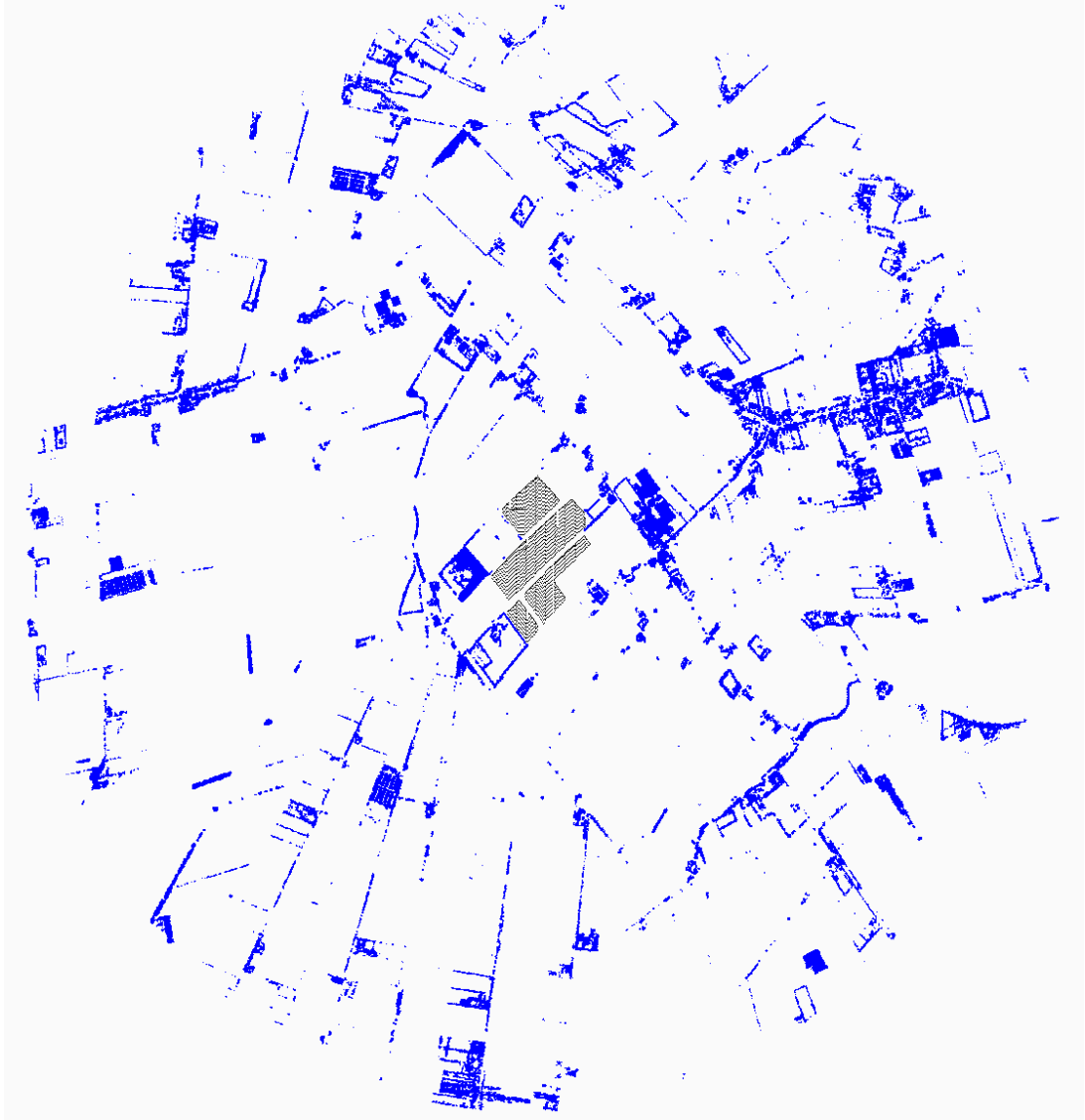
Create DTM and DSM ground models

- Create two sets of ground models. Small, practice, models for honing the processing parameters and bigger sizes for production
- Small models: make with Gridding with around 0.5M triangles
- Big models: Triangulate with a tolerable Z tolerance. 20cm for example. Try to keep < 20M triangles

*Red 4km radius circle used to filter only necessary DTM and DSM points in the ground model



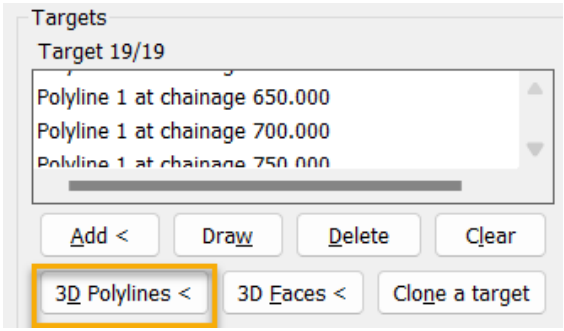
(Advanced, optional) Verify DSM data by creating a visual barrier height model. Example shows detected 2m or higher visual barriers.



Two, Running the ZTV analysis

Setting up the target points

- Drape a 3D Polylines onto ground where the solar panels would be
- Move the draped polylines vertically up to tope level of the panels
- Use the **"3D Polylines <"** button to select the polylines
- Use Chainage intervals to specify the target points

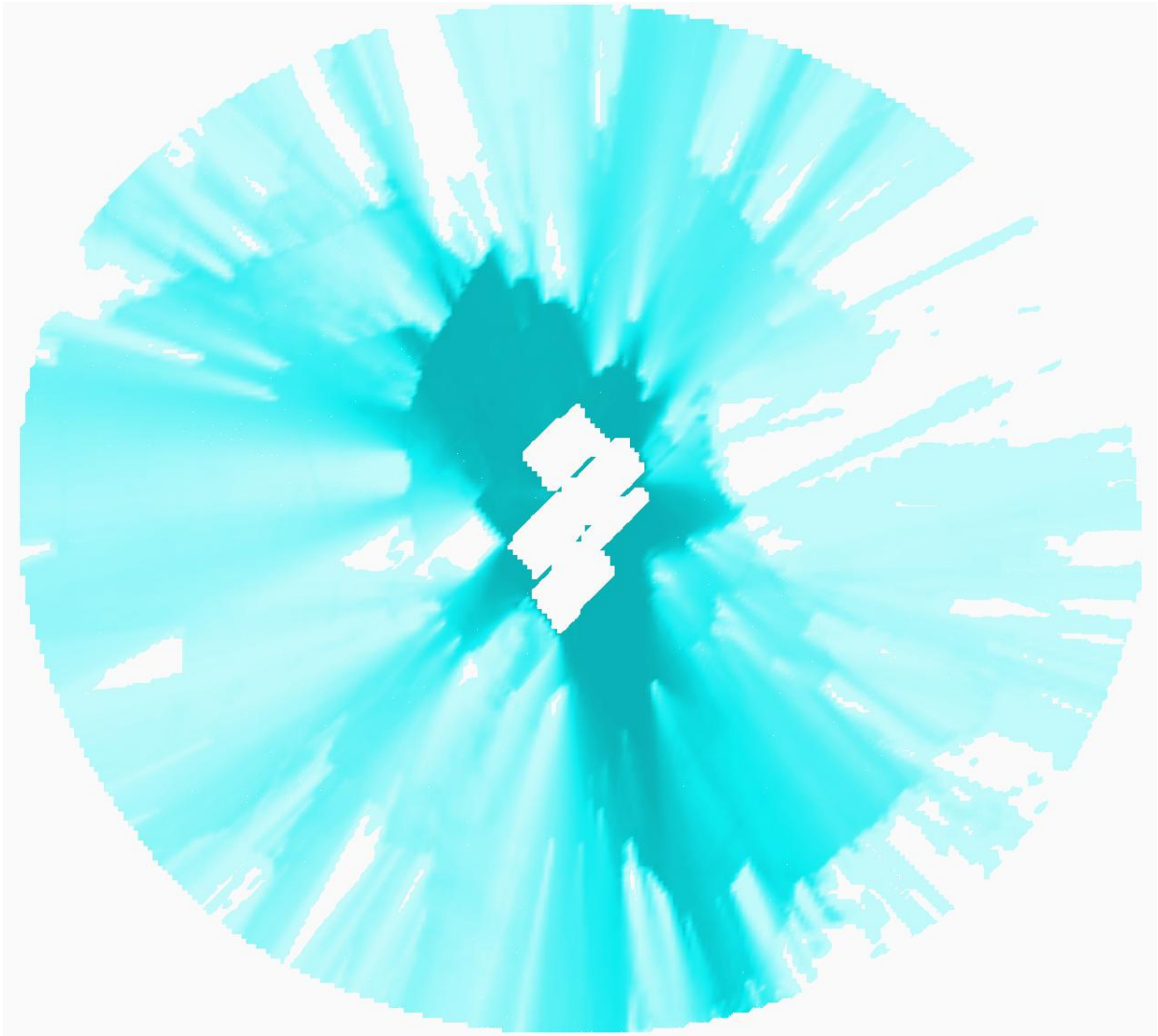


- This will be an iterative process to select a reasonable amount of target points
- Most studies need only few target points, 1 to 20, say, but projects with large target area might need more points to be accurate. In any case try to keep the number of target point at 254 or less.

- As with the models, make two sets of target points which you save into .sky files
  - One with large Ray Resolution for testing, eg 50m or more
  - One with normal parameters for production, eg 15m
  - Save the tp configurations in two separate .sky files
- If you have special areas which need extra attention you can create specific .sky files for each
  - Draw closed 2D Polylines around the special areas
  - Create a sky file for each separately
  - Use the 3D Polylines as always
  - Say "Yes" to question **"Define Study Area with a closed 2D Polyline"** and select one polyline
  - Save each special area to separate sky file (they need to be run separately)
  - You can use good (=small) ray resolution on these areas because they are small areas compared to whole project

Test run the settings with small models and large ray resolution .sky file

- Verify that the result looks roughly what you'd expect



After finding good run settings, start main process with big models and accurate resolution sky file

- WORK ON LOCAL HARD DISK
- Make sure all files are local (or in "ZTV temp path" see below), nothing cloud storage
- Do not use VPN or even LAN storage
- Temp files can take 1TB of space so make sure you have a big fast local HDD to use
- By default temp files are in current dwg folder
- See KTF Configure and Ground Model Settings and "ZTV temp path", set it if necessary
- Normally you don't draw the rays, only make a ZTV model
- A good habit is to name the ZTV result model with a prefix ZTV, eg "*ZTV 254tps 5m_res 3200m_rays.kgm*“
- Open "time_left_to_complete_ZTV.txt" in Notepad while processing for some more runtime details
- Note that you can interrupt the process by creating a file "stop_ztv_now.txt"

Three, Processing the result into delightful colors

Use '**KTF>Ground Modelling>Analysis and Color mapping>Z value**'

The ZTV model will have two kind of information in it

- Positive Z values tell how many target points are visible at that location
- Negative Z values tell how deep in the invisibility shadow the observer (eye height) is from closest visible target point

Normally use only positive values, this shows where from the target is visible from

Remember with color bands, start from Z of 0.0, ignore negative values

If you have, for example, 100 target points then Z level color band 0 to 25 represents "up to 25% of site visible" etc.

Processing time planning

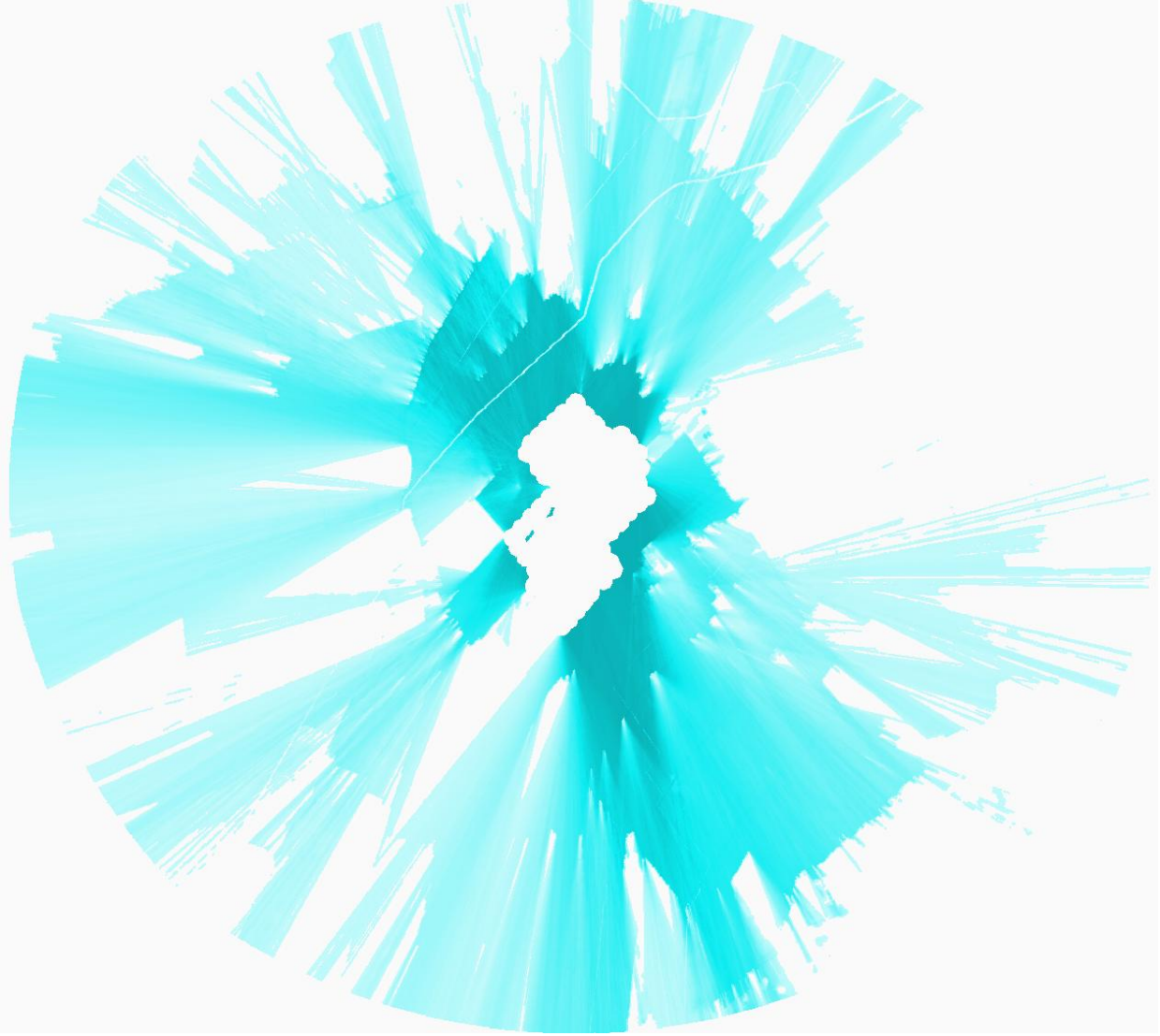
Processing time depends on

- Number of target points
- Ray resolution
- DTM and DSM model sizes

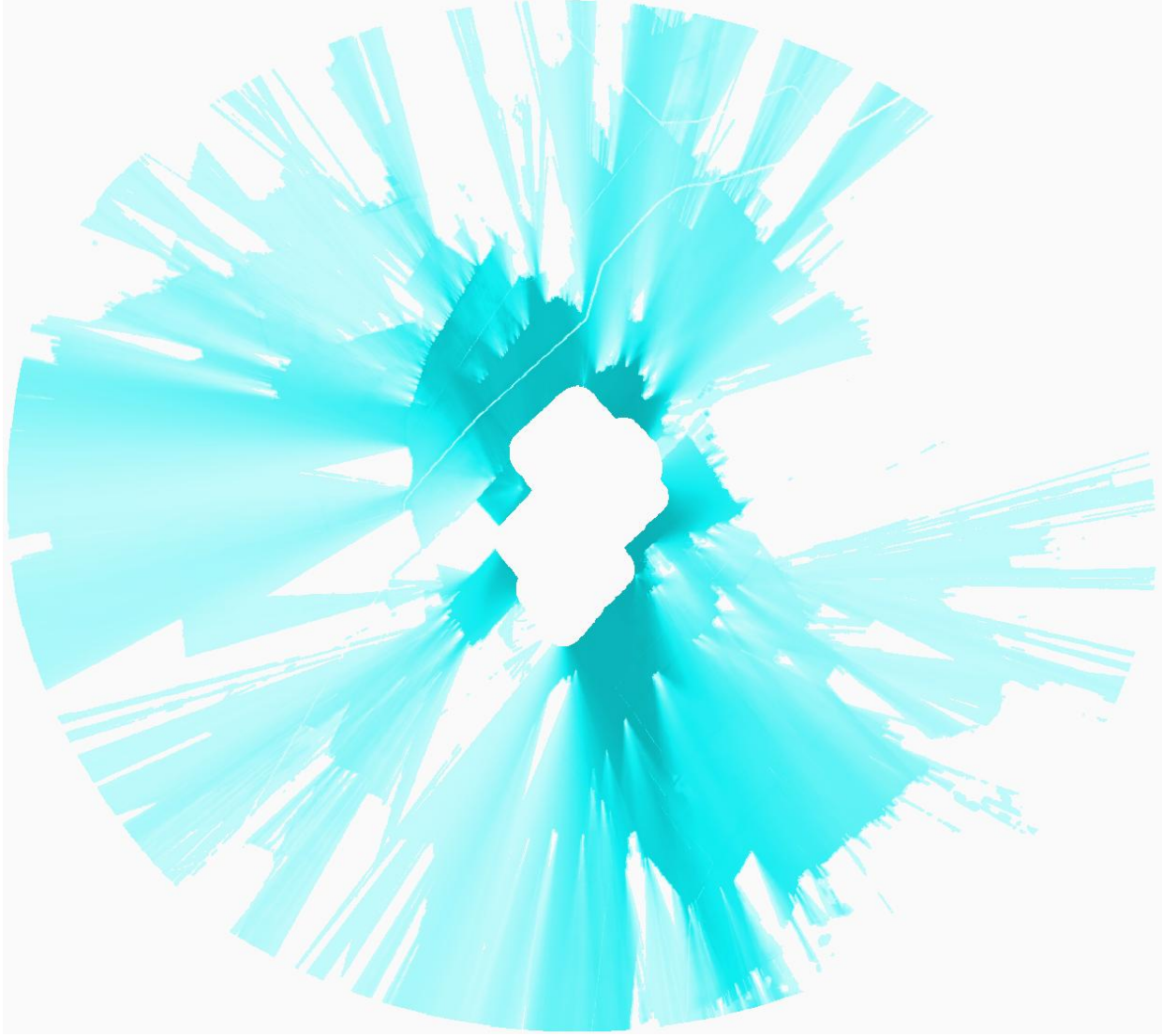
Consider processing the whole site in reasonable resolution and only one or two special areas with high accuracy.

Target points	Processing time
2707	3 days 13 hours
535	16 hours
254	7 hours 51 min
144	3 hours 50 min

Sample processing times with various number of target points.

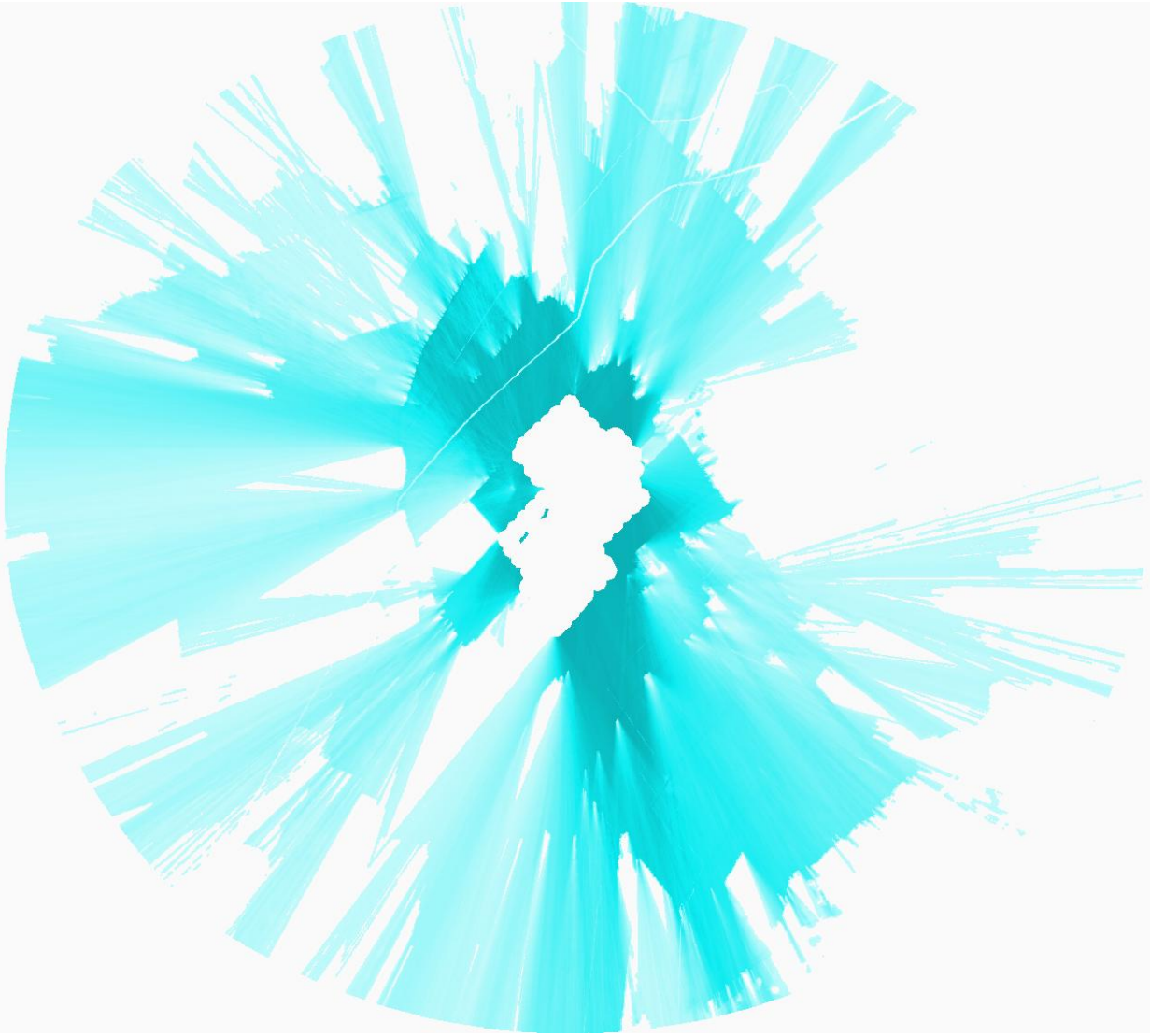


Process time 3 hours 50 min
144 target points, 5m ray resolution

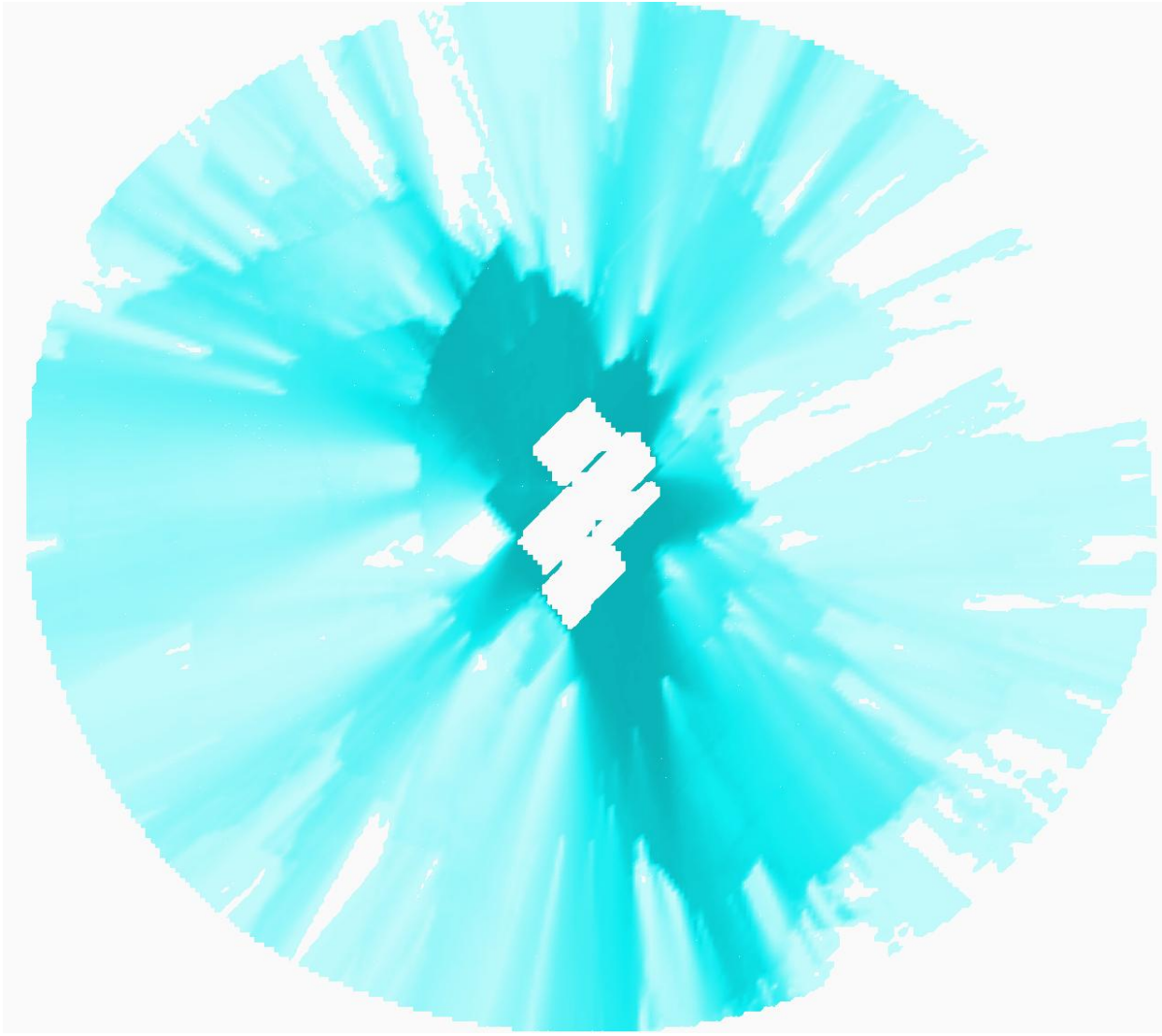


Process time 3 days 13 hours
2707 target points, 5m ray resolution

ZTV result comparation 1

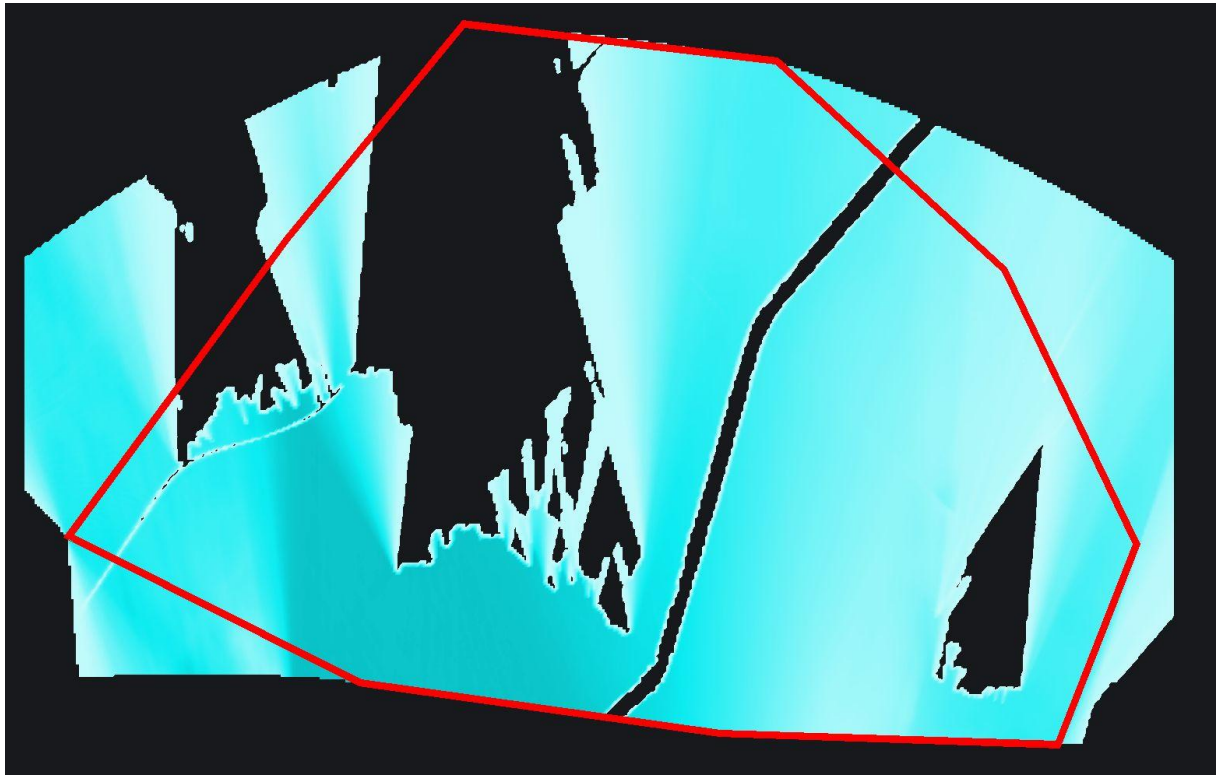


Process time 3 hours 50 min
144 target points, 5m ray resolution

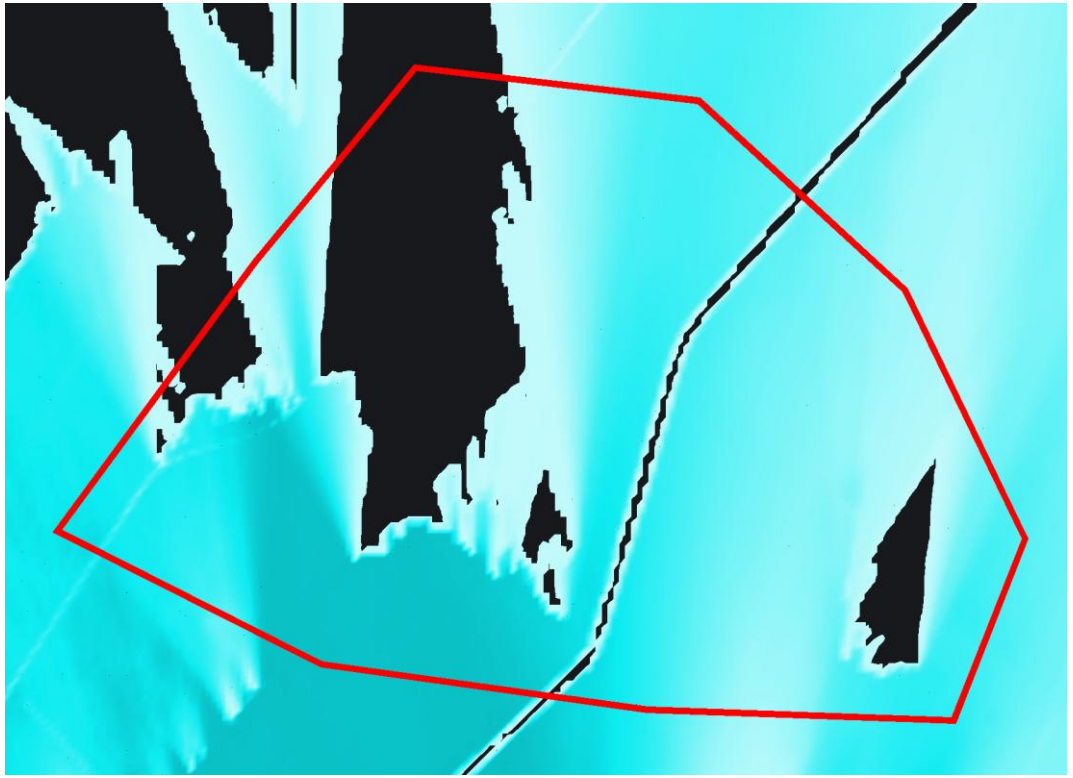


Process time 18 hours
2707 target points, 25m ray resolution

ZTV result comparation 2



Special area processed with 2m ray resolution



Zoomed into the special area in 5m ray resolution

ZTV result comparation 3

Conclusion

- Optimise processing time and accuracy
- Usually, use better ray resolution over number of target points
- Depends on project
- In any case plan carefully the target point locations