



# LiDAR Mapping Systems

## **Post Processing - Applying a Geoid in TerraSolid**

Revision Date: May 14, 2019

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**NOTE:** This brief provides a description of the workflow for applying a geoid file to a dataset in the United States. Your location and the product(s) you purchased may not support certain functions dedicated to specific models, upgrades or software.

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# Applying a Geoid in TerraSolid

The Phoenix LiDAR Systems' Post Processing workflow creates LAS/LAZ in Ellipsoidal height, but if data is required to have orthometric height values, a geoid can be applied in the final stages of post processing in TerraSolid.

## 1 Prepare Data for use in TerraScan

### 1.1 Download Continental United States Geoid model from Phoenix LiDAR Systems

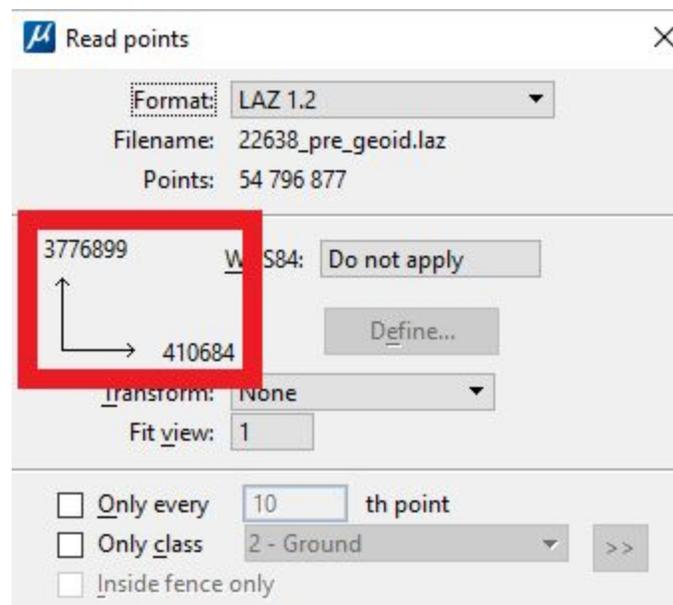
Download the Continental US Geoid 12B LAZ file that has been optimized for use in TerraScan on our website at:

Client Links > Downloads > Geoids

This Geoid file is only applicable for the continental United States. Projects in other areas will require custom Geoid file with proper latitude, longitude, and dz values. Please contact [Support@phoenixlidar.com](mailto:Support@phoenixlidar.com) if you need a geoid model for TerraSolid.

### 1.2 Coordinate ranges, Projection systems, and Bounding delineation

Use TerraScan to read all the points in the project. If the project contains too many points to load all at once, read a representative tile (a center tile). In the dialog that pops up first, note the Easting and Northing origin of the data in its local projection system.



*Coordinate origin of a LAZ file (in its local projection system)*

Go to the TerraScan toolbar and locate the main toolbar and open “Scan Define Coordinate Setup”. Ensure the resolution is at least 1000 (mm scale resolution) and that the Easting and Northing Origin will contain the coordinate origin of the data.

Units and resolution	
Master unit:	m
Resolution:	1000 per m

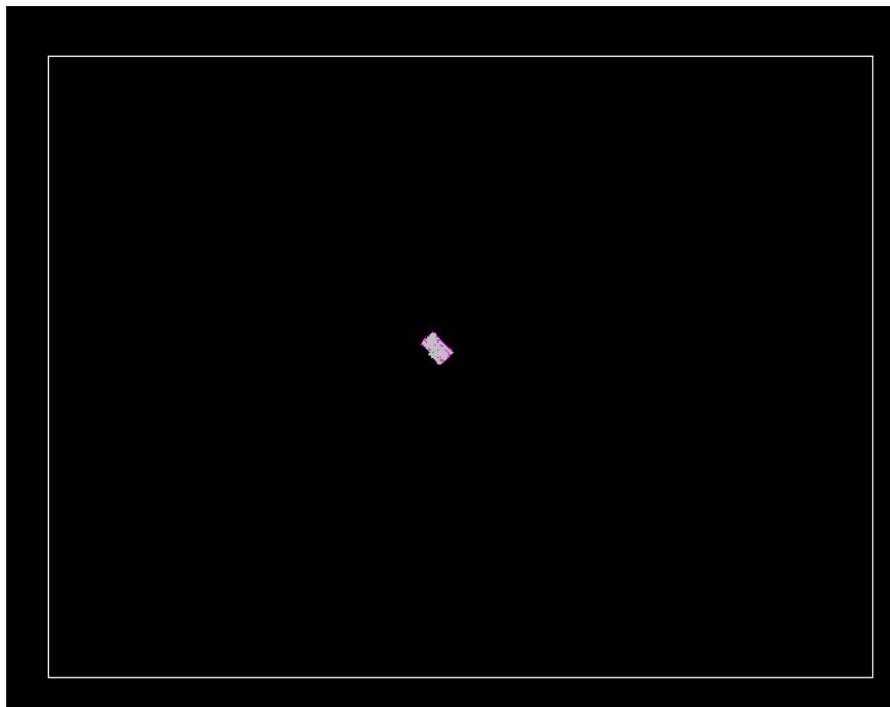
Origin	
Easting:	400000.000
Northing:	3700000.000
Elevation:	0.000

Coordinate range	
Easting:	-1747484 .. +2547484
Northings:	+1552516 .. +5847484
Elevations:	-2147484 .. +2147484

*TerraScan's Define Coordinate Setup*

Use the 'place shape' or 'draw fence' tool to create a bounding box around the project area. The geoid file is very sparse, so this delineation needs to be **at least 5x larger than your project area**. This will ensure that TerraScan will have enough points to apply a valid model to the project needing a geoid adjustment.

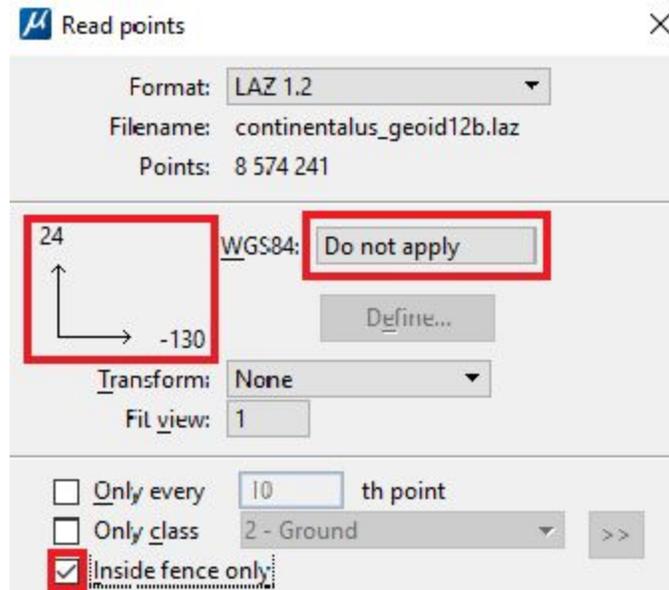


*Bounding box for loading the Geoid file*

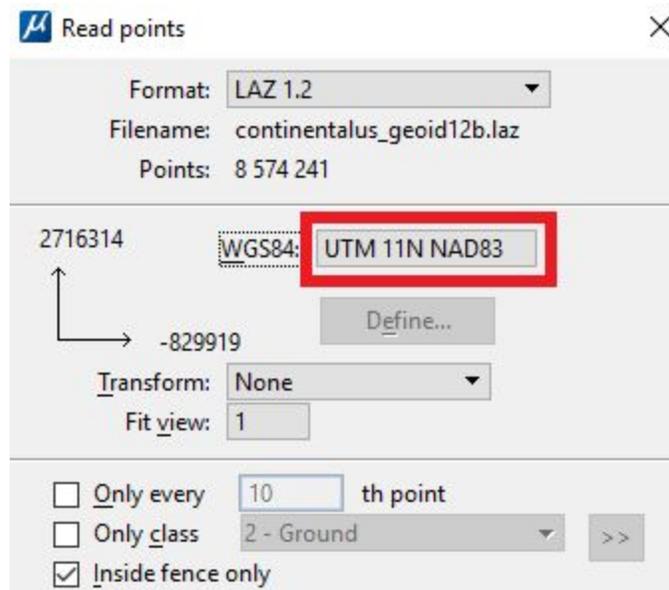
### 1.3 Preparing Geoid Model

Highlight the bounding box created earlier and use TerraScan to 'read points'. All geoid files distributed by Phoenix LiDAR Systems are in WGS84, and need be transformed/projected to match your LiDAR data's datum/projection. You will likely apply the same transformation/projection used while importing your trajectory.

Load the Geoid LAZ and in the 'read points' dialog, apply the proper projection to match the LiDAR dataset, and select 'Inside fence only'.

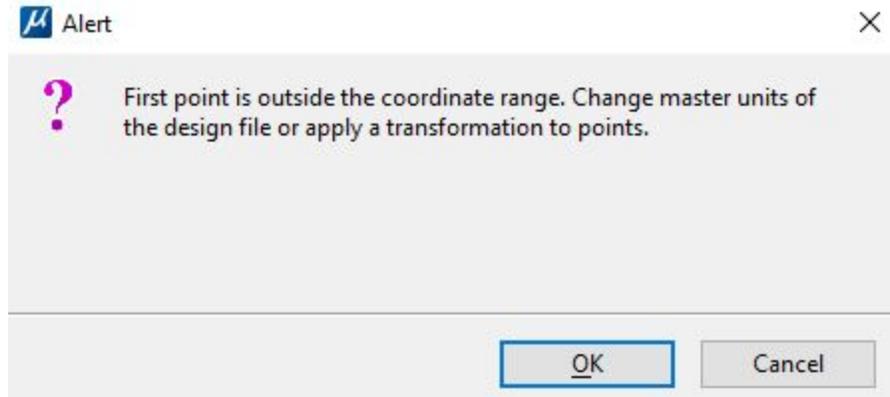


*Reading in the geoid file "Inside fence only". The geoid is in WGS84 lat lon coordinates*



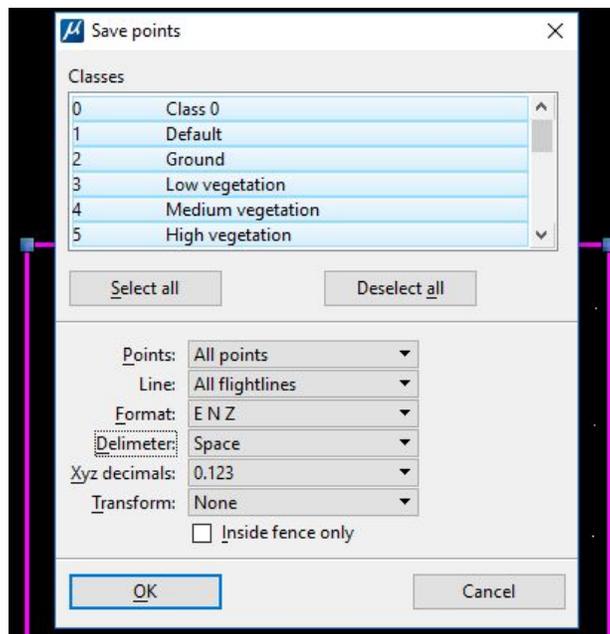
*Select the proper projection to match the lidar data*

An alert will sometimes pop up saying that the first point is outside of the coordinate range, but click ok and disregard, as loading inside the fence alleviates this problem.



*Click OK when alert dialog pops up*

With the Geoid points loaded, use TerraScan to 'Save points as' and save the geoid points as an ENZ file and ensure the extension is .xyz.

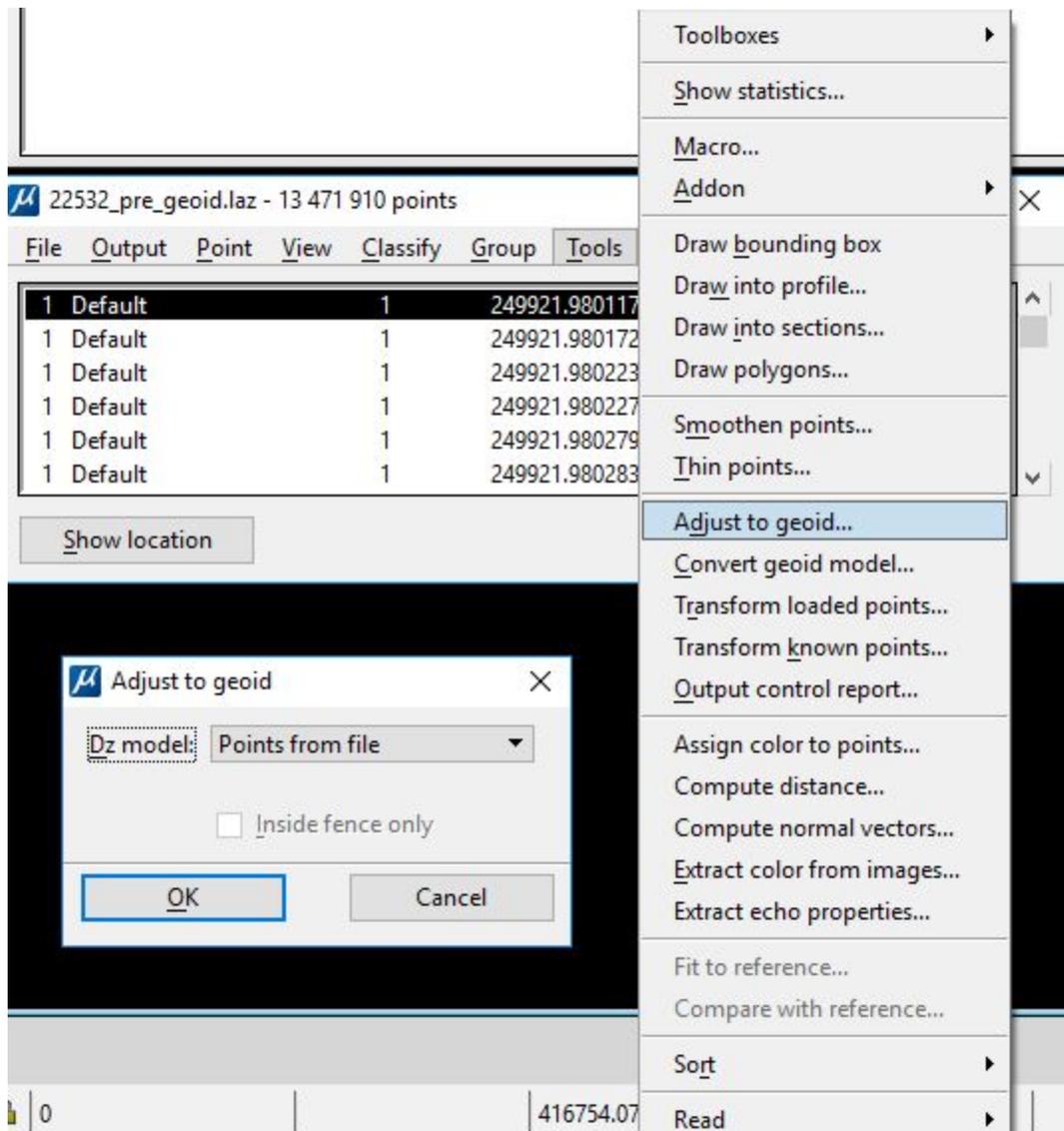


*Save points as ENZ (when naming the file, ensure .xyz is the extension)*

## 2 Apply the Geoid in TerraScan

### 2.1 Applying the Geoid Model

Once the Geoid file has been loaded and saved for the general region of the project, the dataset is ready for the application of the Geoid. If the dataset is in a 'Project', use the "Define Project" dialog to use 'Tools->Adjust to Geoid', otherwise load all the LiDAR points in TerraScan and use the main TerraScan dialog: 'Tools->Adjust to Geoid'. Select the Geoid.xyz file from the previous step. TerraScan will apply the dz values to the points by overwriting them, so if a backup is desired, make a copy prior to the 'Adjust to Geoid' step.



*Applying a geoid to a loaded dataset*

This content is subject to change.

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