

Leica FAQ

Question How do I install a geoid model in LGO/SKI-Pro so that I will have the ability to use orthometric heights?


Background A geoid model is required to compute geoid separations which enables LGO to derive orthometric heights.

You must attach a geoid model to a coordinate system and then attach that coordinate system to your project. Once this is done, you will be able to compute geoid separations that will provide orthometric heights.

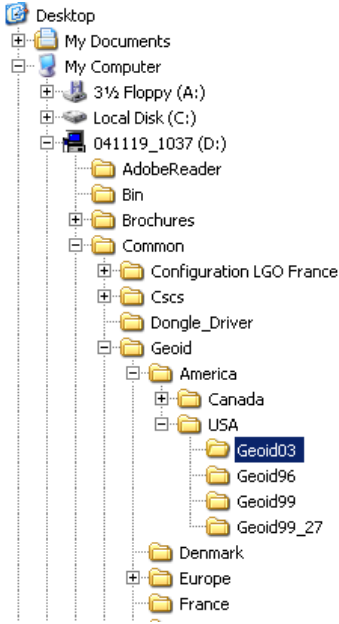
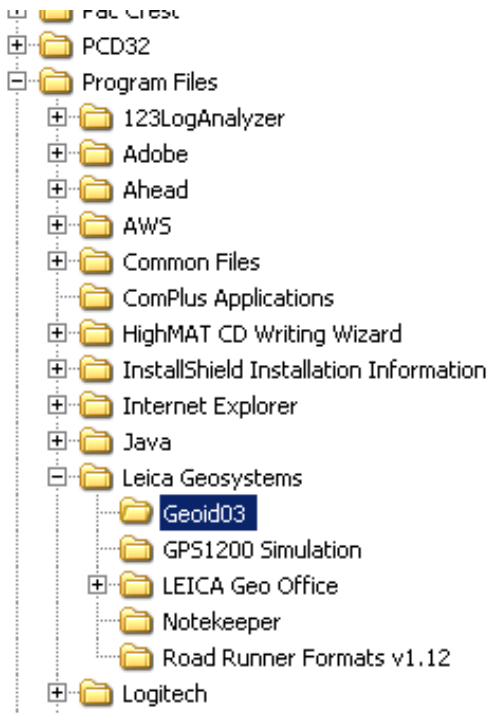
First we must copy Geoid03 from the LGO or SKI-Pro CD to our computer's hard drive. Then in LGO or SKI-Pro we'll create a geoid model from the files we copied from the CD, attach it to a coordinate system, and then attach that coordinate system to a project. Finally we'll compute geoid separations so we can see orthometric heights

Answer Follow the directions below to install a geoid model in LGO or SKI-Pro, compute geoid separations, and view orthometric heights.

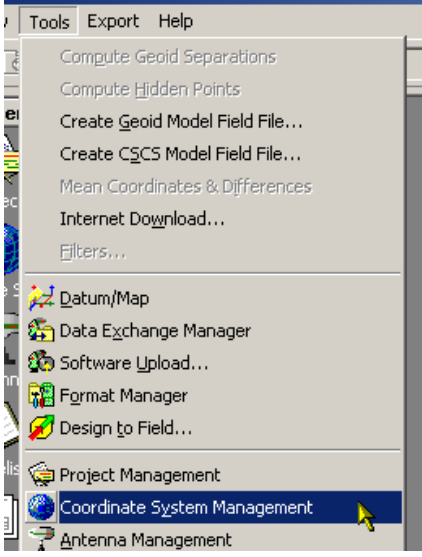
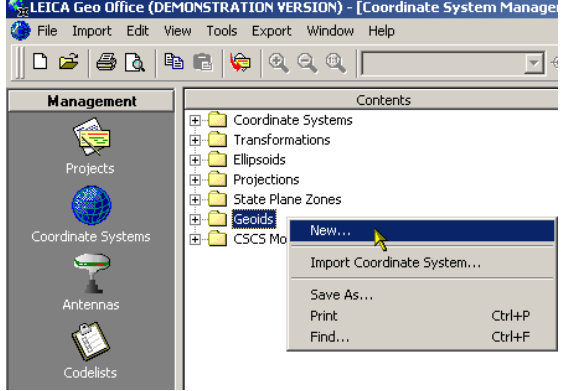
For the remainder of this document, we will be using the term "LGO" as a replacement for the term "LGO or SKI-Pro".

Step	Action	Display
1	<p>From within Microsoft Windows:</p> <ul style="list-style-type: none"> • Insert the LGO CD into your CD drive. <p>The auto-run software installation process will begin. When you have an opportunity to stop or cancel this, do so.</p> <ul style="list-style-type: none"> • Press the Exit button. <p>This stops the installation procedure and closes the window.</p>	


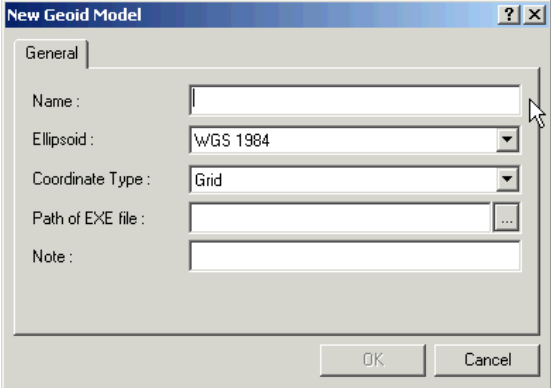
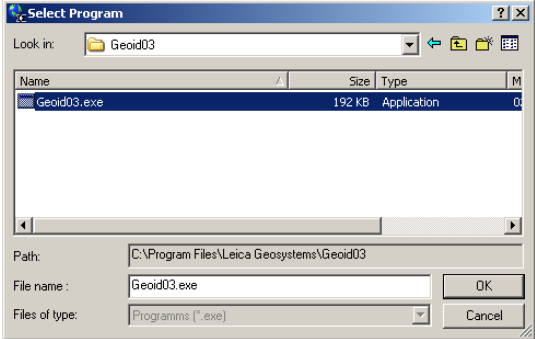
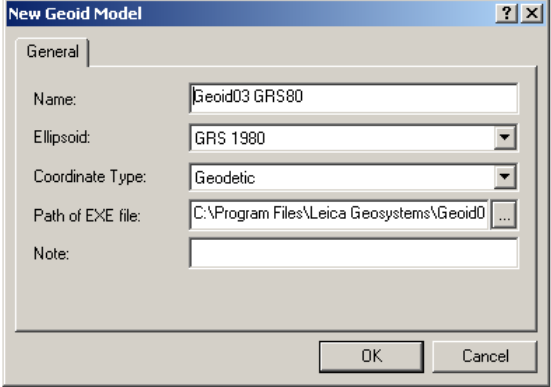
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Step	Action	Display
2	<p>From within Windows Explorer:</p> <ul style="list-style-type: none"> • Navigate to your CD drive. <p>In this example it is the “D” drive</p> <ul style="list-style-type: none"> • Open the Common folder. • Open the Geoid folder. • Open the America folder. • Select the GEOID03 folder. • Copy this folder. <p>We now want to paste this folder into the Leica Geosystems folder on your computer’s hard drive.</p>	
3	<p>Continuing in Windows Explorer:</p> <ul style="list-style-type: none"> • Navigate to your C: drive. • Open the Program Files folder. • Open the Leica Geosystems folder. • Paste the GEOID03 folder into the Leica Geosystems folder. <p>Note: Do not be concerned if you do not have the same folders in your Leica Geosystems folder as in the image on the right, but you should have the newly copied GEOID03 folder.</p> <p>We have copied the Geoid03 geoid model folder to your hard drive. Now we must create a geoid model in LGO and attach it to a coordinate system.</p>	

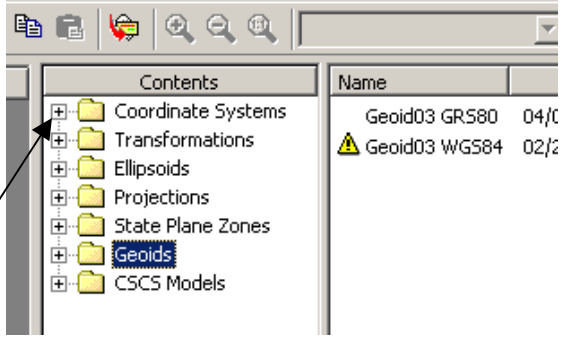
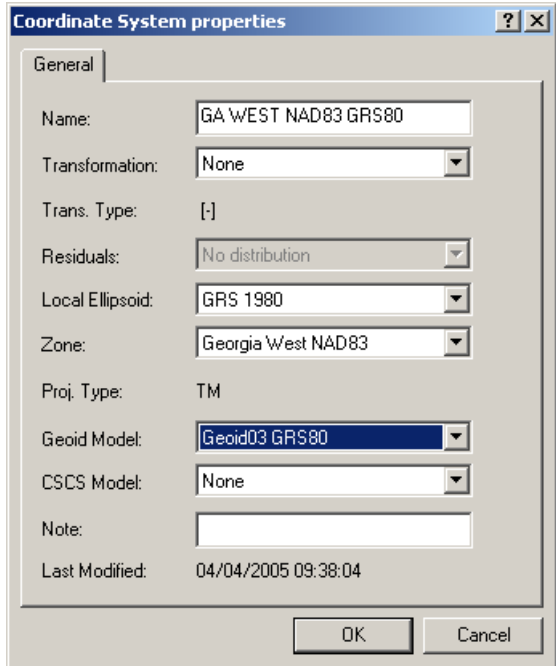
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Step	Action	Display
4	<p>From within Microsoft Windows:</p> <ul style="list-style-type: none"> • Start LGO. • Click on the “Tools” pull-down menu within LGO. • Select “Coordinate System Management”. <p>This open the “Coordinate System Management” view.</p>	 <p>The screenshot shows the 'Tools' menu in the LGO application. The menu items are: Compute Geoid Separations, Compute Hidden Points, Create Geoid Model Field File..., Create C_SCS Model Field File..., Mean Coordinates & Differences, Internet Download..., Filters..., Datum/Map, Data Exchange Manager, Software Upload..., Format Manager, Design to Field..., Project Management, Coordinate System Management (highlighted with a mouse cursor), and Antenna Management.</p>
5	<p>From within the “Coordinate System Management” view:</p> <ul style="list-style-type: none"> • Right-click on the “Geoids” folder. • Select “New...” from the pop-up window. <p>This opens the “New Geoid Model” window.</p>	 <p>The screenshot shows the 'Coordinate System Management' window in LGO. The left sidebar contains folders for Projects, Coordinate Systems, Antennas, and Codelists. The main area shows a tree view of the 'Contents' folder, including Coordinate Systems, Transformations, Ellipsoids, Projections, State Plane Zones, Geoids, and C_SCS Mo. A context menu is open over the 'Geoids' folder, with the 'New...' option selected. Other options in the menu include Import Coordinate System..., Save As..., Print (Ctrl+P), and Find... (Ctrl+F).</p>

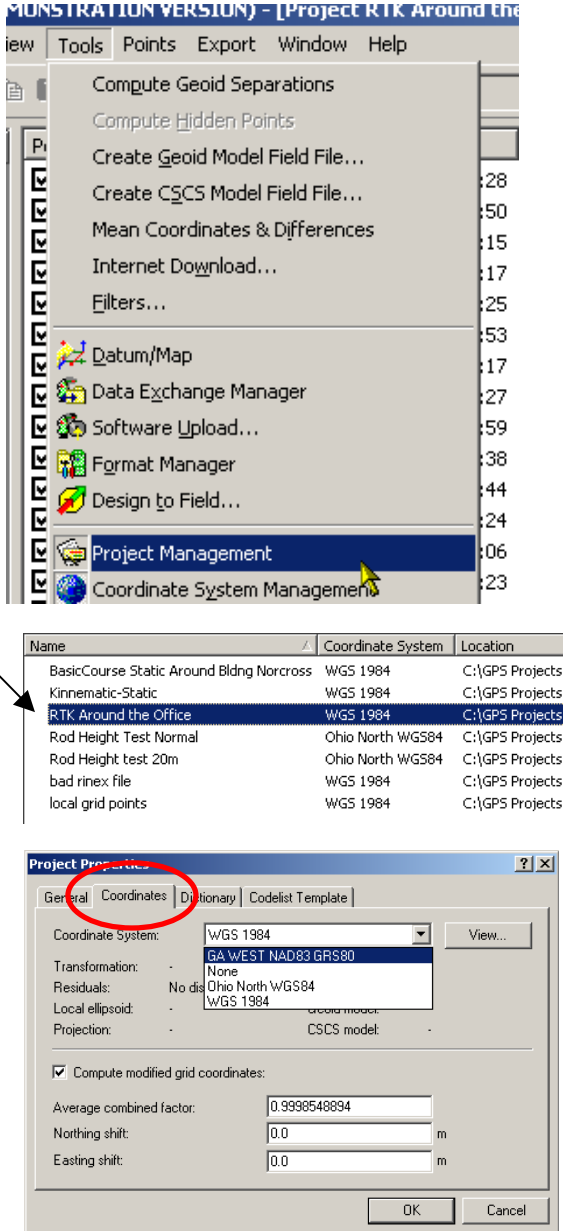
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Step	Action	Display
6	<p>From within the “New Geoid Model” window:</p> <ul style="list-style-type: none"> • Enter a name for the new Geoid model. • Select “GRS 1980” as the ellipsoid. <p>Note: We are using the GRS 1980 ellipsoid for this particular geoid model because this model will then be attached to a NAD83 state plane coordinate system that uses a GRS 1980 ellipsoid. It is imperative that the ellipsoid for the geoid model match the ellipsoid for the coordinate system!</p> <ul style="list-style-type: none"> • Select Geodetic as the coordinate type. • Click on the  button. <p>This opens the “Select Program” window.</p> <ul style="list-style-type: none"> • Navigate to where the “GEOID03” folder is stored. • Open the “GEOID03” folder. • Select “Geoid03.exe”. • Press the OK button. <p>This closes the “Select Program” window and returns you to the “New Geoid Model” window.</p> <p>You have the option of entering a note but it is not required.</p> <ul style="list-style-type: none"> • Press the OK button. <p>This closes the “New Geoid Model” window and creates the geoid model.</p>	  

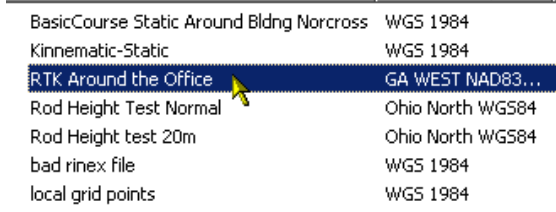
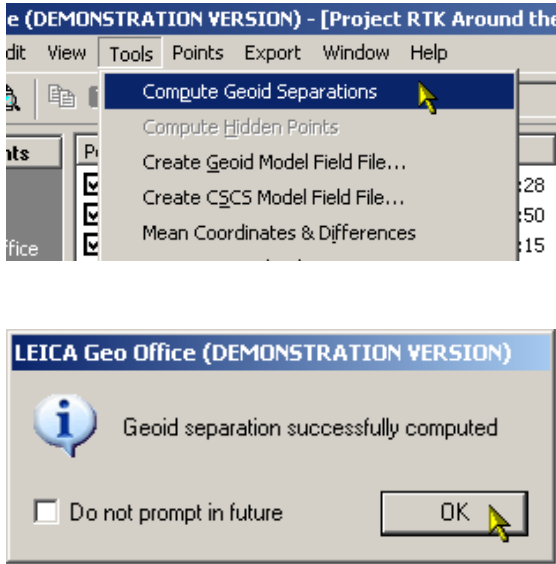
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Step	Action	Display
7	<p>Continuing within the “Coordinate System Management” view:</p> <p>We can now see the newly created geoid model in the Geoids folder.</p> <p>The next step is to attach this geoid model to a coordinate system.</p> <ul style="list-style-type: none"> • Open the “Coordinate Systems” folder. <p>If you do not have any coordinate systems created, see this FAQ: http://www.leicaatl.com/support/gps/gps_faqs/faqs/SKI_Pro_Questions/How%20do%20I%20create%20a%20coordinate%20system.pdf to create one.</p>	
8	<p>In the “Coordinate Systems” folder:</p> <ul style="list-style-type: none"> • Right-click on an existing coordinate system. • Select “Properties” in the pop up window. <p>This opens the “Coordinate System properties” window.</p> <p>In this example we are editing the “GA West NAD83 GRS80” coordinate system. Notice the term “GRS80” is in the name. This is to keep clear which ellipsoid was used with this coordinate system.</p> <ul style="list-style-type: none"> • Click on the down arrow in the Geoid Model: field. • Select Geoid03. • Press the OK button. <p>This attaches the geoid model to a coordinate system.</p>	




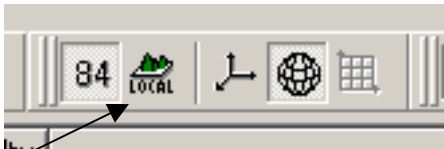
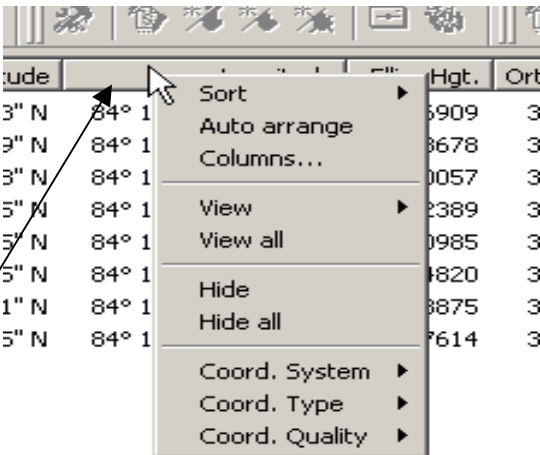
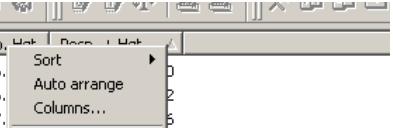
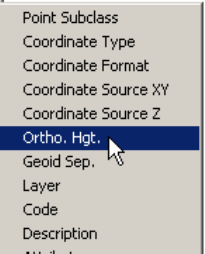
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Step	Action	Display																								
9	<p>We now have a geoid model attached to a coordinate system. Now we must attach this coordinate system to an existing project.</p> <ul style="list-style-type: none"> From the “Tools” pull down menu: Select “Project Management”. <p>This takes you to the “Project Management” view.</p> <p>Continuing in the “Project Management” view:</p> <p>Select a project to attach a coordinate system to. In this example we’ll use “RTK Around the Office”.</p> <ul style="list-style-type: none"> Right click on the project. <p>This opens a pop-up window.</p> <ul style="list-style-type: none"> Select “properties”. <p>This opens the “Project Properties” pop-up window.</p> <ul style="list-style-type: none"> Click on the “Coordinates” tab. <p>In the Coordinate System field:</p> <ul style="list-style-type: none"> Select the coordinate system containing the newly created geoid model. Press the OK button. <p>This attaches the coordinate system to the project.</p>	 <p>The screenshot displays the software interface. At the top, the 'Tools' menu is open, showing various options. 'Project Management' is highlighted. Below the menu is a table of projects:</p> <table border="1"> <thead> <tr> <th>Name</th> <th>Coordinate System</th> <th>Location</th> </tr> </thead> <tbody> <tr> <td>BasicCourse Static Around Bldg Norcross</td> <td>WGS 1984</td> <td>C:\GPS Projects</td> </tr> <tr> <td>Kinematic-Static</td> <td>WGS 1984</td> <td>C:\GPS Projects</td> </tr> <tr> <td>RTK Around the Office</td> <td>WGS 1984</td> <td>C:\GPS Projects</td> </tr> <tr> <td>Rod Height Test Normal</td> <td>Ohio North WGS84</td> <td>C:\GPS Projects</td> </tr> <tr> <td>Rod Height test 20m</td> <td>Ohio North WGS84</td> <td>C:\GPS Projects</td> </tr> <tr> <td>bad rinex file</td> <td>WGS 1984</td> <td>C:\GPS Projects</td> </tr> <tr> <td>local grid points</td> <td>WGS 1984</td> <td>C:\GPS Projects</td> </tr> </tbody> </table> <p>The 'Project Properties' dialog box is open, with the 'Coordinates' tab selected. The 'Coordinate System' dropdown is set to 'GA WEST NAD83 GRS80'. Other fields include 'Transformation: None', 'Residuals: No dis', 'Local ellipsoid: WGS 1984', and 'Projection: CSCS model'. The 'Compute modified grid coordinates' checkbox is checked. The 'Average combined factor' is 0.9998548894, and both 'Northing shift' and 'Easting shift' are 0.0 m.</p>	Name	Coordinate System	Location	BasicCourse Static Around Bldg Norcross	WGS 1984	C:\GPS Projects	Kinematic-Static	WGS 1984	C:\GPS Projects	RTK Around the Office	WGS 1984	C:\GPS Projects	Rod Height Test Normal	Ohio North WGS84	C:\GPS Projects	Rod Height test 20m	Ohio North WGS84	C:\GPS Projects	bad rinex file	WGS 1984	C:\GPS Projects	local grid points	WGS 1984	C:\GPS Projects
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Step	Action	Display
10	<p>Continuing in LGO:</p> <p>We have created a geoid model, attached it to a coordinate system, and then attached it to a project.</p> <p>We now need to compute geoid separations and view the orthometric heights.</p> <ul style="list-style-type: none"> • Open the project with the coordinate system attached by double-clicking on the project name. <p>This opens that project.</p>	 <p>A screenshot of the LGO software interface showing a list of projects. The project 'RTK Around the Office' is highlighted in blue, and a mouse cursor is pointing at it. Other projects listed include 'BasicCourse Static Around Bldng Norcross', 'Kinnematic-Static', 'Rod Height: Test Normal', 'Rod Height test 20m', 'bad rinex file', and 'local grid points'. Each project has a coordinate system listed to its right, such as 'WGS 1984' or 'GA WEST NAD83...'.</p>
11	<p>From within the opened project:</p> <ul style="list-style-type: none"> • Click on the “Tools” pull down menu. • Select “Compute Geoid Separations”. <p>This computes the geoid separations.</p> <p>When the computation is complete a pop-up message appears.</p> <ul style="list-style-type: none"> • Press the OK button to accept the message. <p>This closes the pop-up box.</p>	 <p>Two screenshots from the LGO software. The top screenshot shows the 'Tools' menu open, with 'Compute Geoid Separations' selected. Other menu items include 'Compute Hidden Points', 'Create Geoid Model Field File...', 'Create C_SCS Model Field File...', and 'Mean Coordinates & Differences'. The bottom screenshot shows a dialog box titled 'LEICA Geo Office (DEMONSTRATION VERSION)' with the message 'Geoid separation successfully computed'. It includes an information icon, a checkbox for 'Do not prompt in future', and an 'OK' button.</p>

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Step	Action	Display
12	<p>Continuing in LGO:</p> <p>We just computed geoid separations. Now we would like to view the orthometric heights.</p> <ul style="list-style-type: none"> Click on the Points tab at the bottom of the screen. <p>This opens the “Points” view.</p> <p>You may not see orthometric heights or geoid separations. If you do not see them:</p> <ul style="list-style-type: none"> Click on the Local  icon. Click on the grid  icon. <p>If you still do not see an “Ortho. Hgt.” column or a “Geoid Sep.” column, you may not have them displayed. To turn on their display:</p> <ul style="list-style-type: none"> Right-click on the column heading. <p>This opens a pop-up window.</p>	  
13	<p>In the pop-up window:</p> <ul style="list-style-type: none"> Select “View”. <p>This opens another pop-up window.</p> <p>In the new pop-up window:</p> <ul style="list-style-type: none"> Select “Ortho Hgt.” Select “Geoid Sep.”. <p>You should now be able to view the geoid separations and orthometric heights.</p>	 

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Step	Action	Display																																																															
14	Continuing in the SKI-Pro "Points" view: The orthometric heights and geoid separations are now displayed.	<table border="1"> <thead> <tr> <th></th> <th>Latitude</th> <th>Longitude</th> <th>Ortho. Hgt.</th> <th>Geoid Sep.</th> <th>Ellip. Hgt.</th> <th>Posn. + Hgt...</th> </tr> </thead> <tbody> <tr> <td>:15</td> <td>33° 58' 16.38633" N</td> <td>84° 11' 34.63993" W</td> <td>346.2454</td> <td>-29.5545</td> <td>316.6909</td> <td>0.0000</td> </tr> <tr> <td>:40</td> <td>33° 58' 15.33889" N</td> <td>84° 11' 32.28559" W</td> <td>346.4219</td> <td>-29.5541</td> <td>316.8678</td> <td>0.0002</td> </tr> <tr> <td>:35</td> <td>33° 58' 13.34968" N</td> <td>84° 11' 33.58969" W</td> <td>346.5597</td> <td>-29.5540</td> <td>317.0057</td> <td>0.0006</td> </tr> <tr> <td>:40</td> <td>33° 58' 16.09175" N</td> <td>84° 11' 31.93683" W</td> <td>345.7930</td> <td>-29.5541</td> <td>316.2389</td> <td>0.0006</td> </tr> <tr> <td>:55</td> <td>33° 58' 09.34025" N</td> <td>84° 11' 37.92782" W</td> <td>347.6526</td> <td>-29.5541</td> <td>318.0985</td> <td>0.0007</td> </tr> <tr> <td>:10</td> <td>33° 58' 10.40545" N</td> <td>84° 11' 35.21352" W</td> <td>347.0359</td> <td>-29.5539</td> <td>317.4820</td> <td>0.0008</td> </tr> <tr> <td>:20</td> <td>33° 58' 12.99261" N</td> <td>84° 11' 40.75190" W</td> <td>347.4422</td> <td>-29.5547</td> <td>317.8875</td> <td>0.0008</td> </tr> <tr> <td>:20</td> <td>33° 58' 11.03825" N</td> <td>84° 11' 39.79740" W</td> <td>347.3159</td> <td>-29.5545</td> <td>317.7614</td> <td>0.0010</td> </tr> </tbody> </table>		Latitude	Longitude	Ortho. Hgt.	Geoid Sep.	Ellip. Hgt.	Posn. + Hgt...	:15	33° 58' 16.38633" N	84° 11' 34.63993" W	346.2454	-29.5545	316.6909	0.0000	:40	33° 58' 15.33889" N	84° 11' 32.28559" W	346.4219	-29.5541	316.8678	0.0002	:35	33° 58' 13.34968" N	84° 11' 33.58969" W	346.5597	-29.5540	317.0057	0.0006	:40	33° 58' 16.09175" N	84° 11' 31.93683" W	345.7930	-29.5541	316.2389	0.0006	:55	33° 58' 09.34025" N	84° 11' 37.92782" W	347.6526	-29.5541	318.0985	0.0007	:10	33° 58' 10.40545" N	84° 11' 35.21352" W	347.0359	-29.5539	317.4820	0.0008	:20	33° 58' 12.99261" N	84° 11' 40.75190" W	347.4422	-29.5547	317.8875	0.0008	:20	33° 58' 11.03825" N	84° 11' 39.79740" W	347.3159	-29.5545	317.7614	0.0010
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Conclusion

In order to compute orthometric heights, a geoid model must be attached to a coordinate system. This coordinate system must then be attached to a project. Then you must compute geoid separations which simultaneously computes orthometric heights.