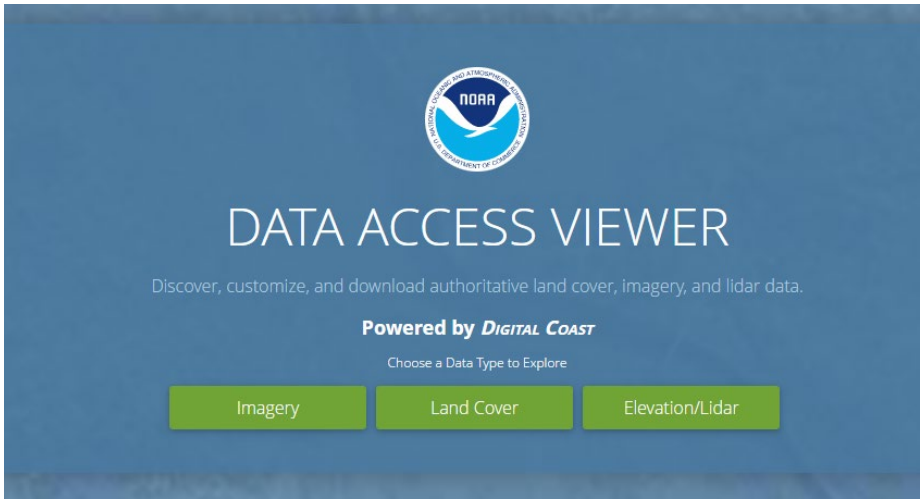
NOAA Lidar Contours for Drainage Design

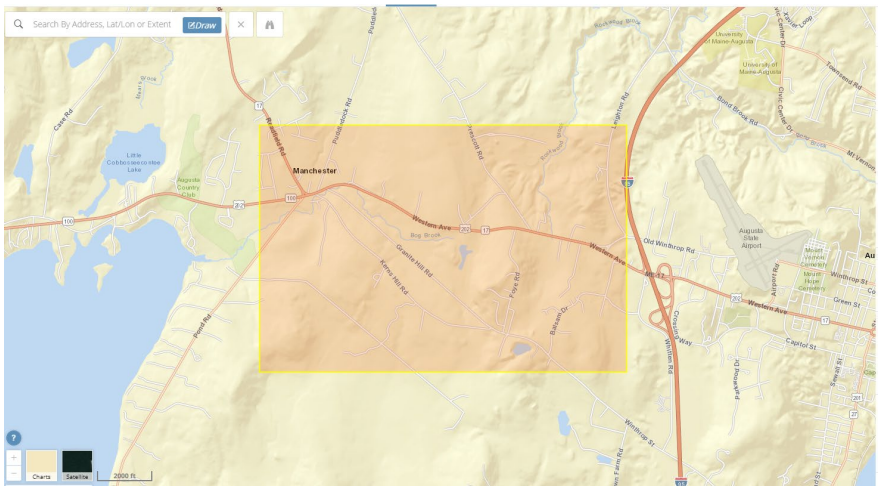
1. Request Contour data from NOAA Data Access Viewer.
    a. NOAA's data access viewer has aerial LiDAR data for the vast majority of the state of Maine. The data can be viewed at NOAA: Data Access Viewer.



For the purpose of drainage design, the relevant data can be found by clicking on the "Elevation/Lidar" button. From here, you are directed to a map of the US. Anything shaded in orange falls within the available database from NOAA.

    b. From within this window, you can search in the address bar at the top left by address or latitude/longitude, or you can simply zoom to the extent that you wish to view.

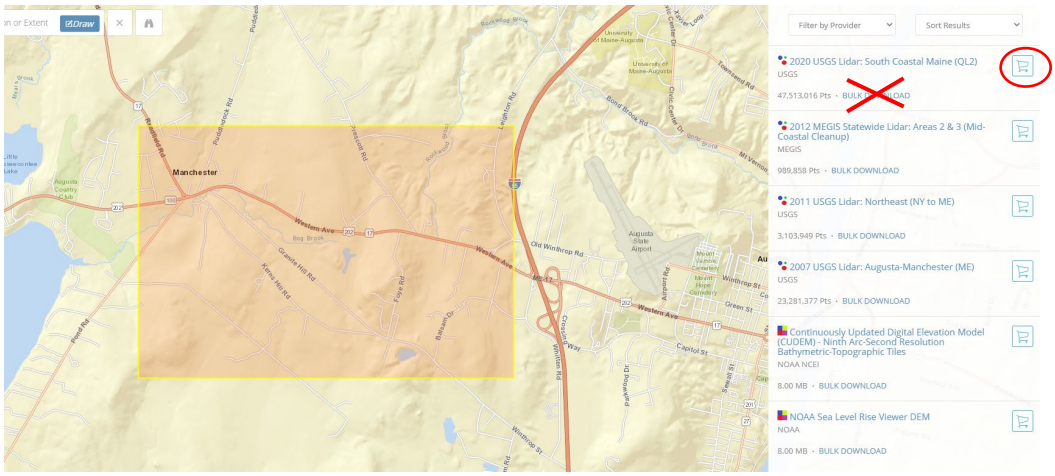
    c. Once you've found your project location, select the draw button next to the address bar and draw a polygon around the area of interest.



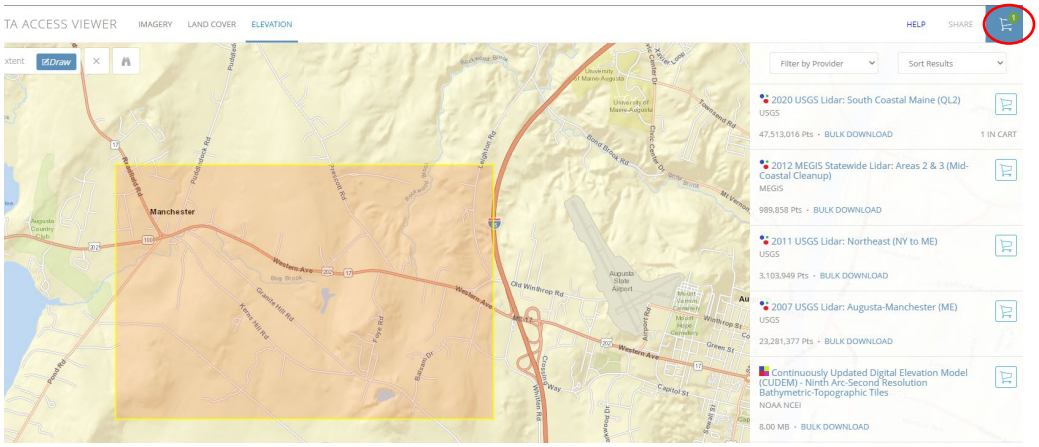
Make sure to select enough area that the full drainage areas can be drawn on the contours – otherwise you'll be running through this process again

Also, if your project is longer or has a large drainage basin, you may want to divide your lidar request into two or three sections to reduce the chance of creating a file that is large and cumbersome for Microstation to load.

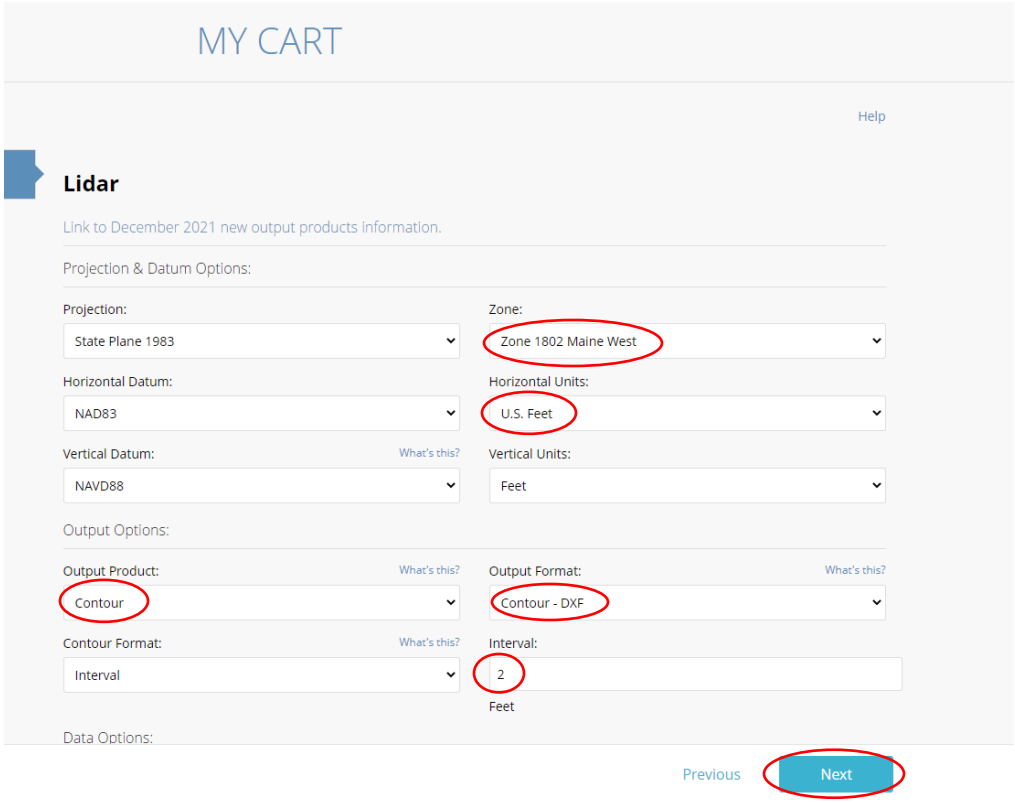
d. The polygon automatically generates a list of available data on the right side of the screen. **DO NOT SELECT BULK DOWNLOAD!** Instead, click the icon featuring the shopping cart to the right of the desired data set.



e. With the desired set(s) in your cart, you can now click to view your shopping cart at the top right of the screen.



f. From here, verify that the correct data set(s) are in your cart and click next. This will direct you to a page where data selection occurs.



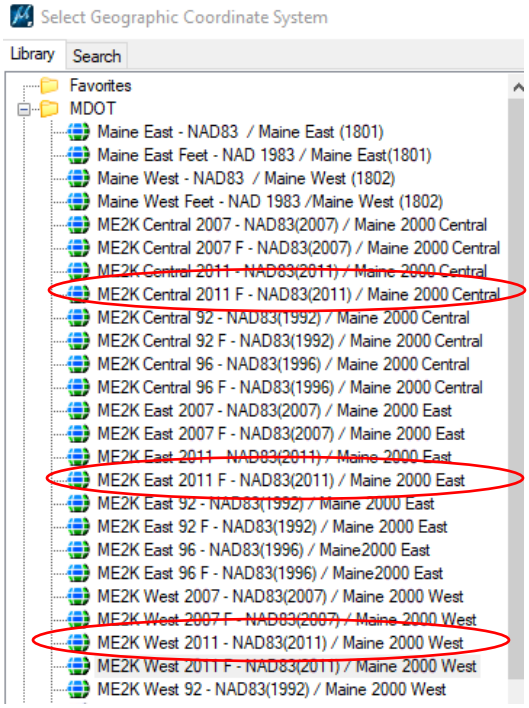
For the purposes of drainage design, the Horizontal Units should be changed to "U.S. Feet", the Output Product should be changed to "Contour", the Output Format should be changed to "Contour-DXF", and you can set your desired contour interval, which will likely be 2 feet. Also note which zone your data will be in: Maine West or Maine East. This will be needed for step 3. With these set, click "Next" at the bottom of the screen.

g. At the next page, simply enter and confirm the email address to which you want the data sent then click "Next" at the bottom of the screen. This brings you to a verification page, summarizing the option you selected from the previous step. If all looks correct, click "Submit" at the bottom of the screen. Once submitted, you will shortly receive a confirmation email that your request has been received. Typically, within 15 minutes (depending on traffic at the website) you will receive another email with your data packet. Your data package will be zipped and require extraction. Extract the data to a known location, typically within the project file. You are mostly interested in the .dxf file.

2. Create required DGN for Drainage Areas
   a. Use Make Sheets as needed to create a Highway_DrainageAreas file. This is the file where we will reference in our contours and drainage areas for flow calculations

   b. Once open, check that the appropriate references are referenced in
      i. This includes topo, alignments, highway, drainage, contours, and any other working files that may influence drainage design.

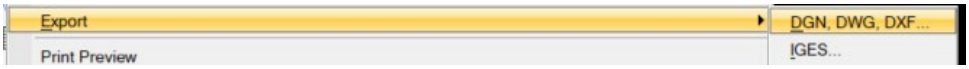
c. Turn off all references and add the appropriate geographic coordinate system to the file. Go to Tools -> Geographic -> Select Geographic Coordinate System.
Then turn your references back on.



d. Now that you have a file with a global coordinate system and the DXF file from your NOAA email, you can create a useable contour file for reference.

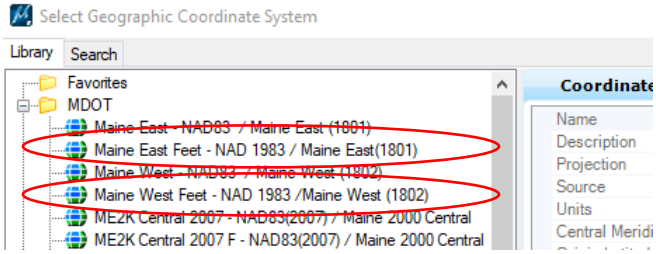
3. Convert DXF file into a useable DGN
   a. Open the DXF file in Microstation

   b. Before you do anything else, Select File -> Export -> DGN

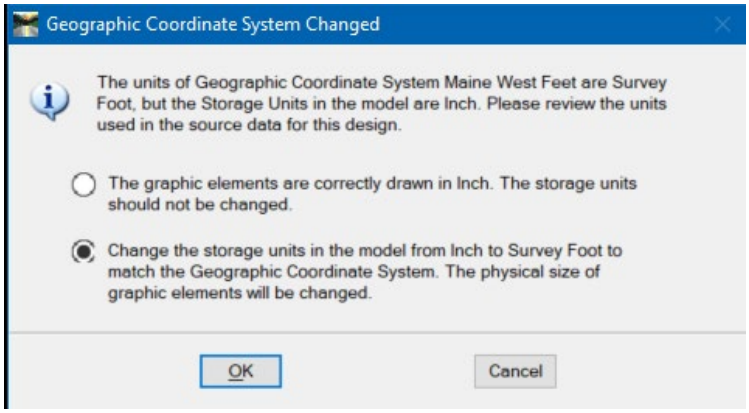


   c. Change the Save As Type to “MicroStation V8 DGN Files (*.dgn) and save the file with the same name that the dxf had. The file won’t open automatically, so you’ll have to File -> Open the newly created DGN.

   d. Set the geographic coordinate system to:



e. **Here is the key step to all of this:** When the "coordinate system changed" warning pops up, you need to select the 2nd option to change the storage units from inch to survey foot.



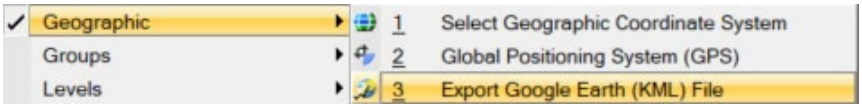
Check the survey units: Settings –> Design File –> Working Units
Sometimes the converted data from NOAA will be in survey inches and sometimes in survey feet. Which won't matter too much for drawing areas unless you're trying to read a contour elevation and see 8448 instead of 704.00.

4. Now that you have a 3D Contour DGN in the appropriate coordinate system and units, you can reference this file into your Highway_DrainageAreas file.
    a. Go to Add Reference -> Select Contour File -> Geographic Reprojected as reference type

5. Or export to a 2D file for ORD prior to adding as a reference
    a. Go to File -> Export -> 2D
        i. Check that it has the correct coordinate system and units as in step 3.

If you want to check, you can export the contour file to a Google Earth KML/KMZ file.

1. Go to Tools -> Geographic -> Export Google Earth File



Note: In some instances, exporting to Google Earth can show a slight shift in the data. This is usually due to the fact that your project vertical datum doesn't match that of the Google Earth datum, and thus is floating up in space, giving the illusion of a shift. One way to fix that visual is in MicroStation, select File –> Export -> 2D, create a 2D drawing of the contours, and export that DGN to a KML/KMZ. The 2D drawing will be forced to drape onto the Google Earth surface and it should look pretty close.

*<u>Once Drainage Areas are drawn</u> – You can export the area shapes to a google earth file to determine the land covers more easily within each area.