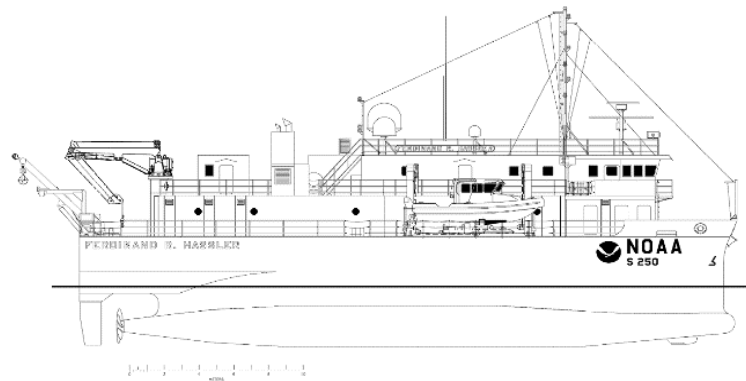| NOAA | NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION UNITED STATES DEPARTMENT OF COMMERCE | NOAA Ship *Ferdinand R. Hassler* Controlled Document |
|---|---|---|

*Ferdinand R. Hassler*
**Line Planning in ArcMap**
Standard Operating Procedures

**Revision History**

| Date | Revision Description (Reason/What) | Updated by |
|---|---|---|
| 04/12/2014 | New | Mueller |
| 05/21/2021 | General Review | ST Tigges |
| 11/19/2023 | Review | LT Debroisse |

## CONTENTS

# 1. OVERVIEW

ESRI ArcMap software may be used as an alternative to Hypack software for line planning. The following is an outline of steps necessary to create a Survey Line Plan in ArcMap.

# 2. WORK INSTRUCTIONS

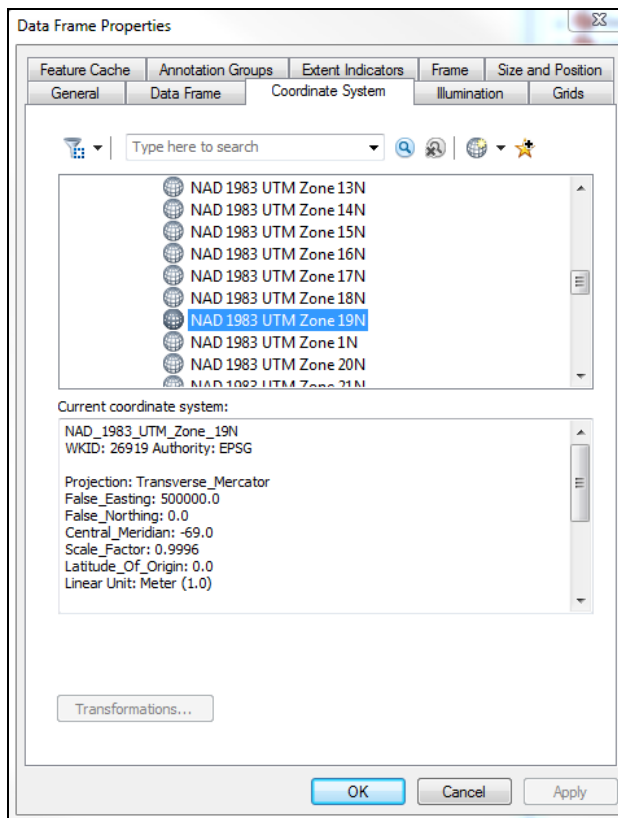## 2.1 CREATE A PROJECT FOLDER, NEW GEODATABASE, AND NEW FEATURE CLASS

Open ArcMap

Click Cancel when the 'Getting Started' dialogue appears

Highlight 'Layers' in the Table of Contents→Right Click→Properties

In the Data Frame Properties dialogue, click the Coordinate System Tab and navigate to:

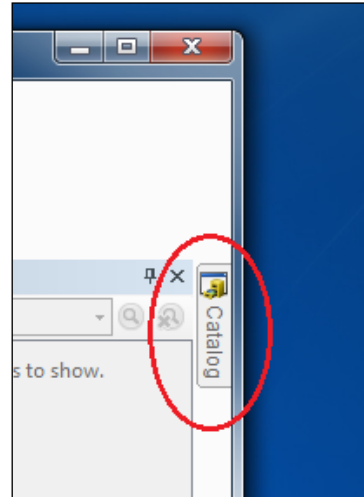Projected Coordinate System →UTM →NAD 1983→NAD 1983 UTM Zone XXN
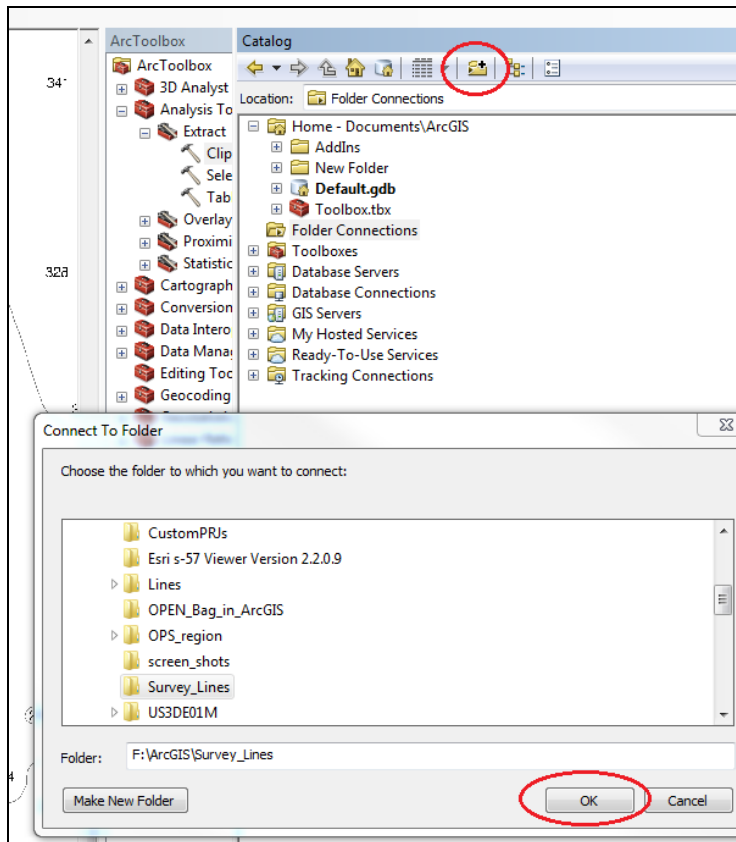


Click Apply. Click OK.

From within ArcMap, open ArcCatalog by clicking on the ArcCatalog icon or the ArcCatalog tab that appears at the far right of the screen:
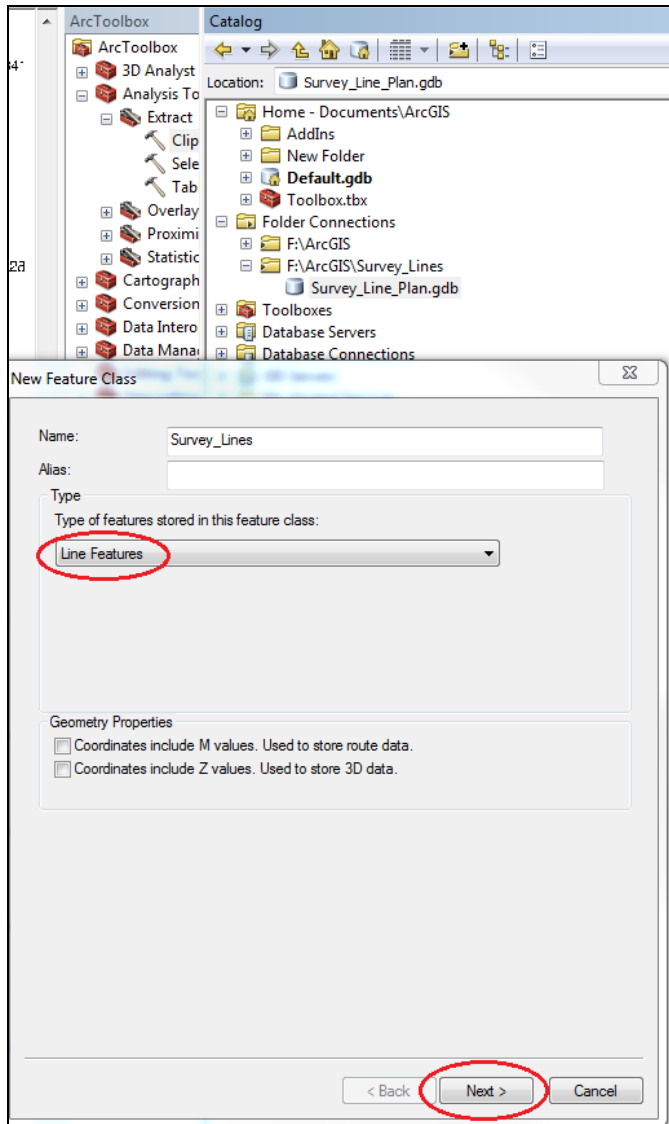
OR:

Connect to a project folder in ArcCatalog:

Click OK

Highlight the project folder →right click→New→File Geodatabase

Create a new feature class within the new file geodatabase:

Highlight the file geodatabase →right click→New Feature Class
Name the New Feature Class, and select 'Line Features' under Type:



Define the coordinate system the same as in the previous step.  (Projected Coordinate System →UTM →NAD 1983→NAD 1983 UTM Zone --N)

Click Next.

For XY Tolerance, accept the defaults →Next
For database storage configuration, accept the defaults → Next

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Open the appropriate chart by dragging the .000 into the Layers (Table of Contents) Window. Click Yes to build Pyramids.

Click 'Close' if the Geographic Coordinate Systems Warning dialogue appears.

*Note: Surfaces in the .bag format may also be opened by dragging it into the Layers (Table of Contents) Window.

*Note: To view an ENC, the ESRI S-57 Viewer must be downloaded and installed. A copy of the viewer is located on the ships network (Survey_Storage\02_Software\ESRI) and may also be downloaded here: http://www.esri.com/software/arcgis/extensions/esri-s57
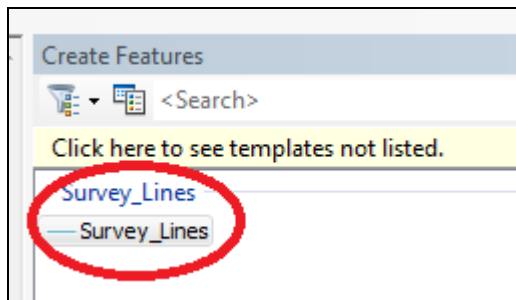
2.2 DRAW (OFFSET) SURVEY LINES:

If the Editor toolbar is not already in ArcMap, go to Customize → Toolbars → Editor. The Editor toolbar will be added at the top of the ArcMap GUI.

Highlight the Survey Lines layer in the Table of Contents Window, then click Start Editing in the Editor Toolbar:
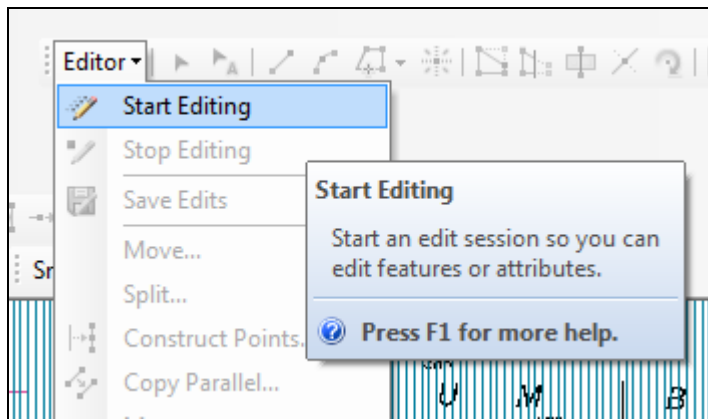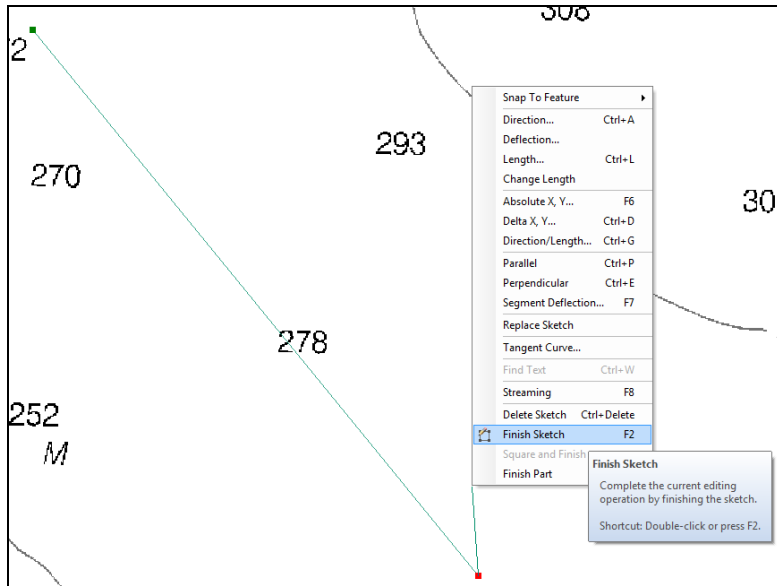


Highlight the Survey Lines layer in the Create Features Window:



Draw a line using the straight segment tool located on the Editor Toolbar:

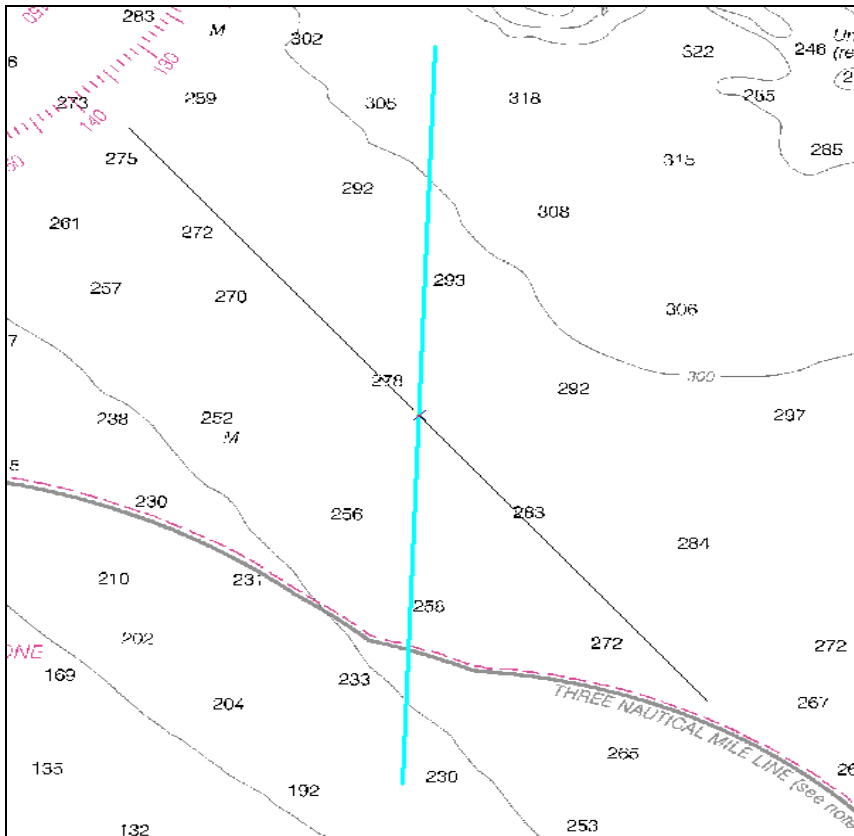*Hard Copy of this SOP is obsolete- the OCS QMS electronic procedure is valid*
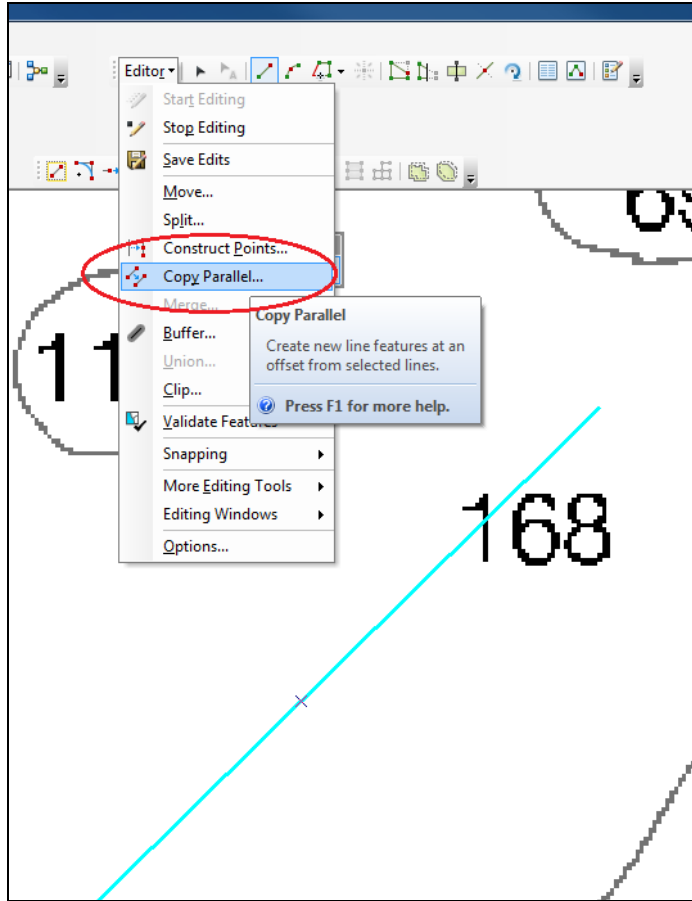
Right Click → Finish Sketch.



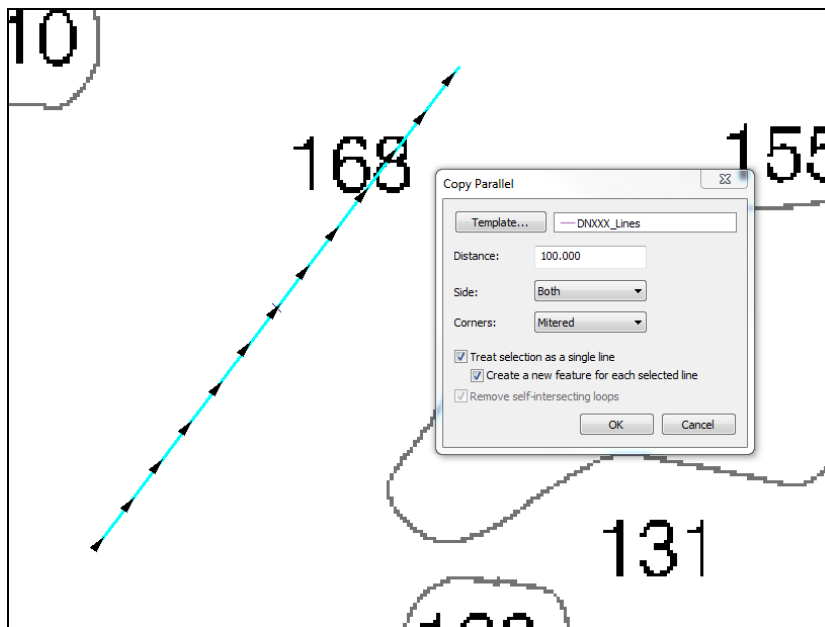If needed, rotate the line to a different orientation.

Select the line [ ] →highlight the rotate tool on the editor toolbar [ ] →
and hover over the line, and then click and drag it to a new orientation:
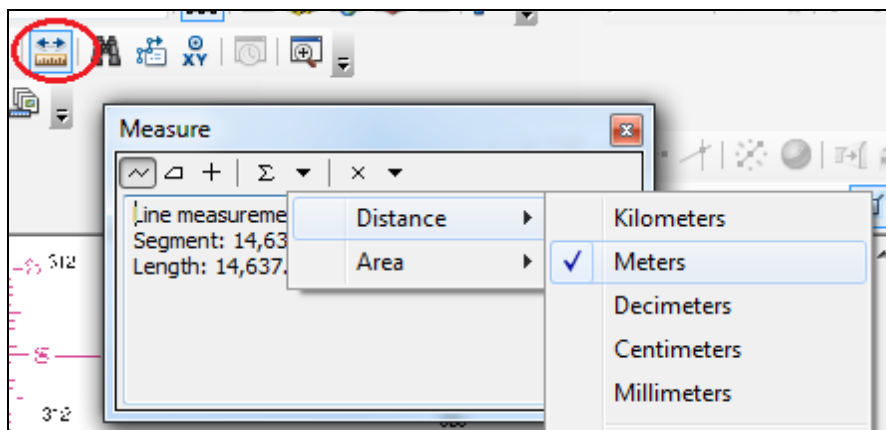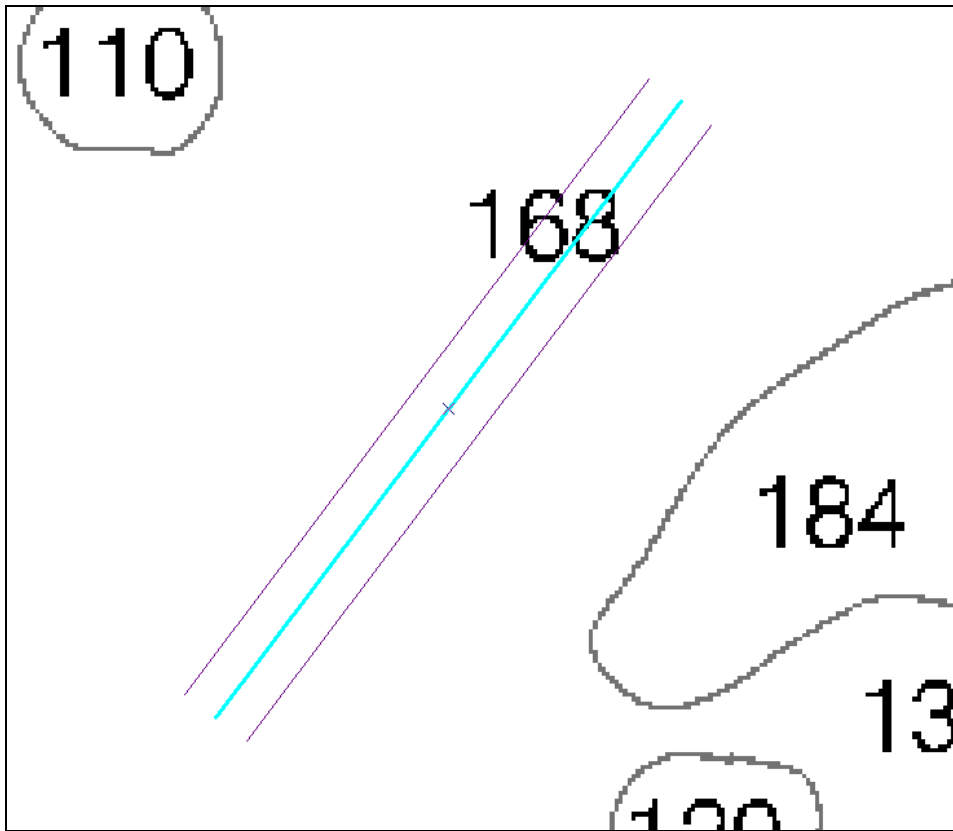
Go to Editor → Copy Parallel →



In the dialogue that appears, select the line offset distance and which side you would like the offset line to appear (left, right, or both).

*Note:  Use the measuring tool to determine line spacing units:



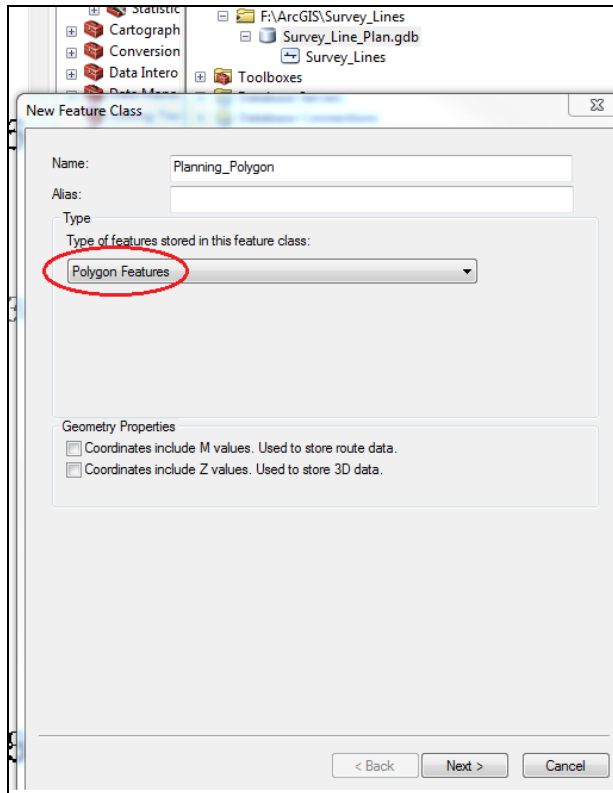Click OK.  The new (offset) lines will appear.

Repeat the process as needed.

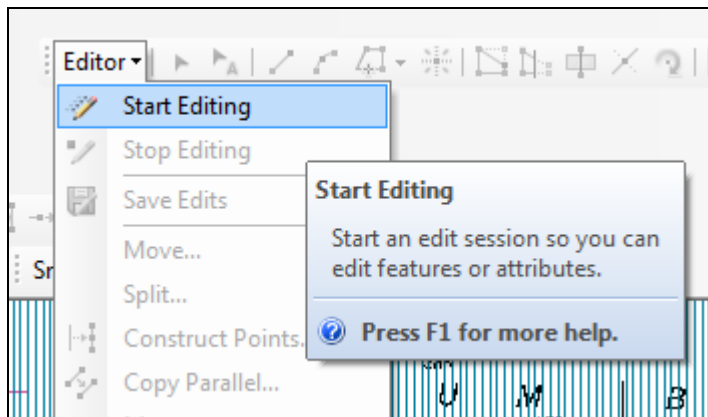## 2.3 ALTERNATE METHOD: POPULATE A POLYGON WITH SURVEY LINES

This method works well for drawing mass quantities of survey lines and utilizes ArcToolbox.

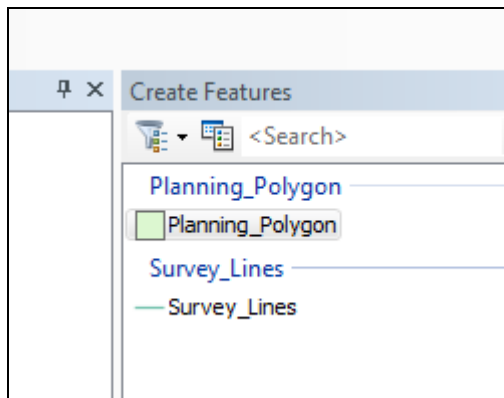Create a new Polygon feature class in ArcCatalog within a geodatabase:

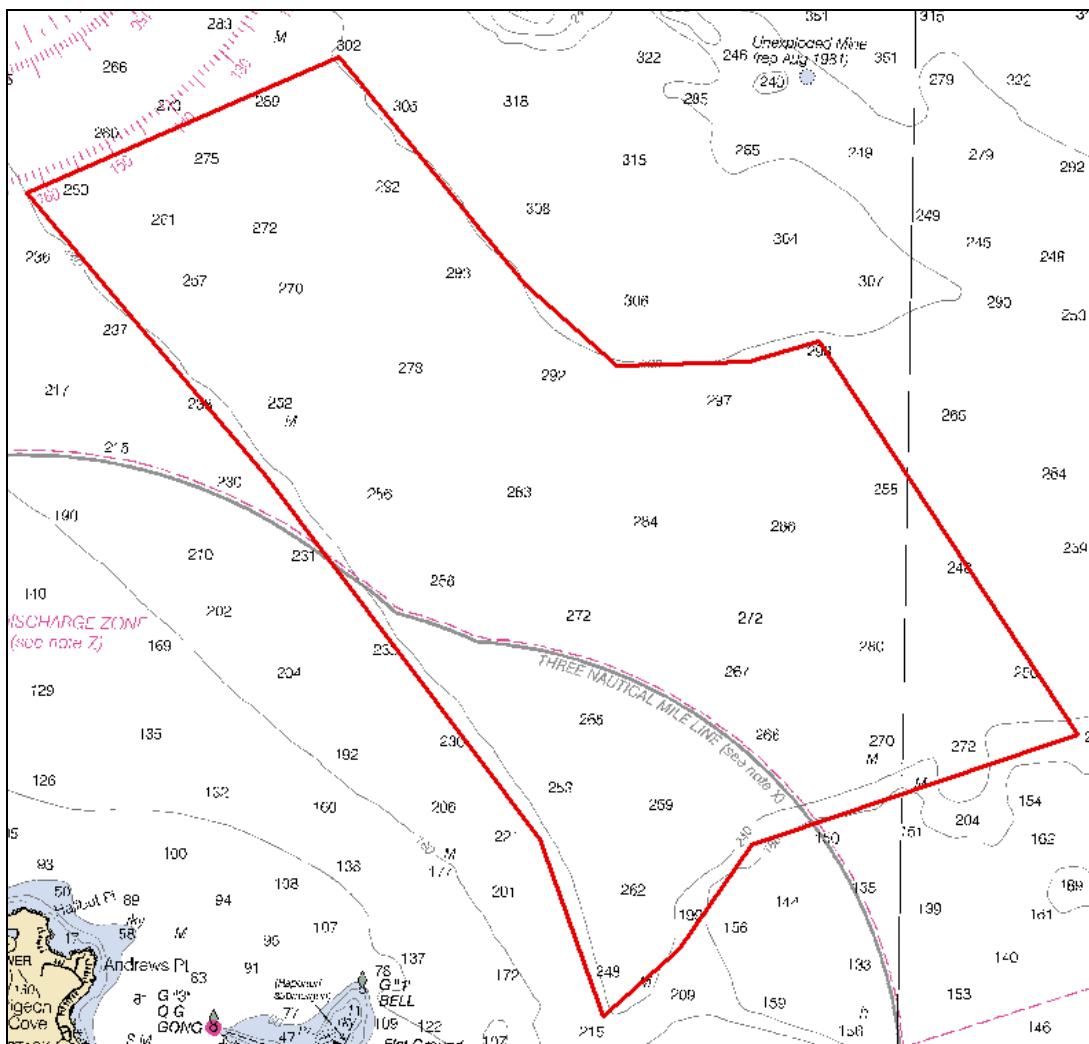The new Planning_Polygon feature will appear in the Table of Contents Window.

Start an Editing Session to draw the polygon:

Highlight the Planning_Polygon Feature in the Create Features Window:



Draw a polygon that encompasses the area that will be surveyed:



Right Click → Finish Sketch
On the Editor Toolbar:  Stop Editing → Save Edits.

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*We want to ensure that our initial 'rough' survey lines overshoot the polygon.  They will be clipped to the polygon boundary in a later step.
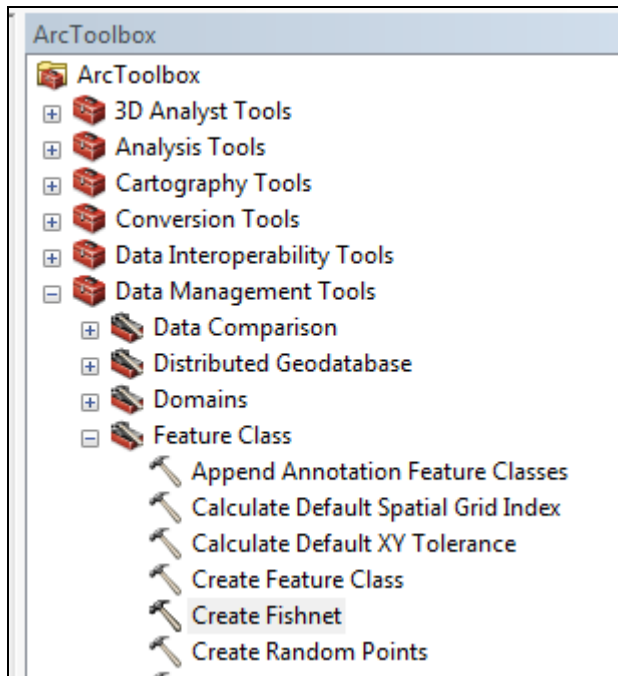
Using the measuring tool, take a rough measurement of the polygon in the lengthwise direction.  Extend the measuring tool well beyond the polygon boundaries and take note of the length:
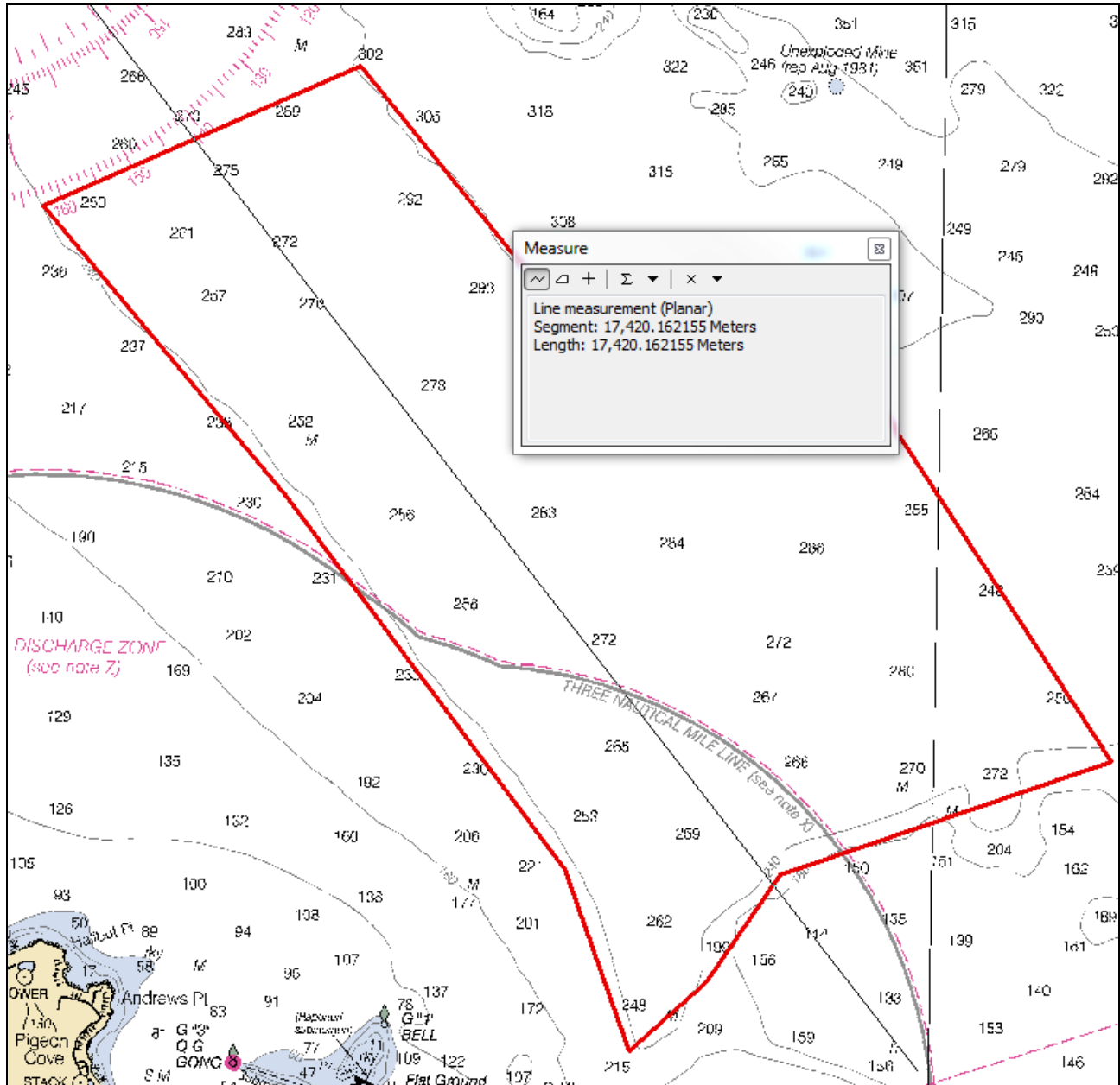
Open ArcToolbox:



Navigate to →Data Management Tools →Feature Class →Create Fishnet

In the Create Fishnet Dialogue complete the following:

Output Feature Class:  Navigate inside your geodatabase to where the Polygon feature resides, and create a new Output feature class called Survey_Lines.
Template Extent:  Same as Layer (Your polygon layer)
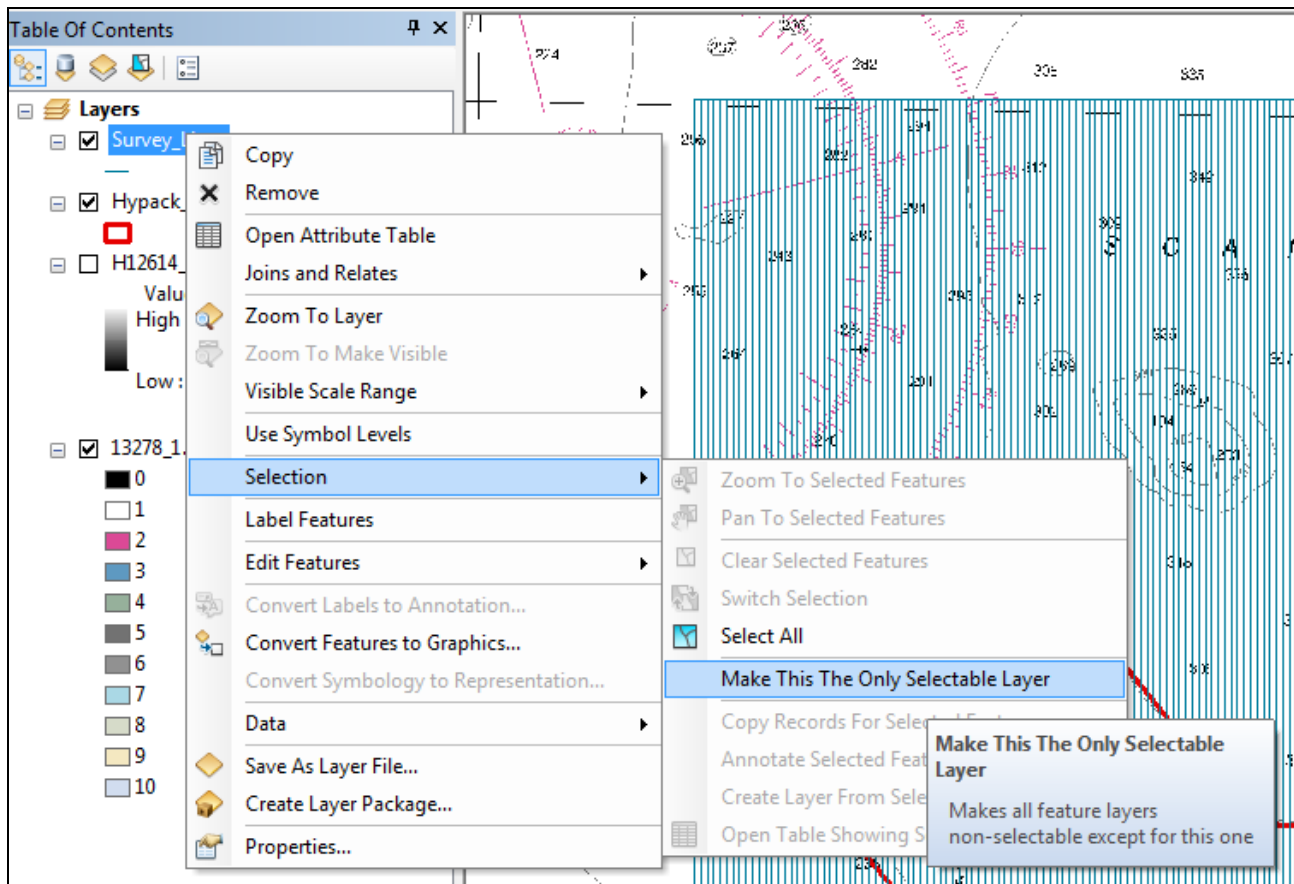Cell Size Width:  80 (for 80 meter line spacing)
Cell Size Height:  17000 (from the earlier rough measurement, these lines will be clipped to fit the polygon)
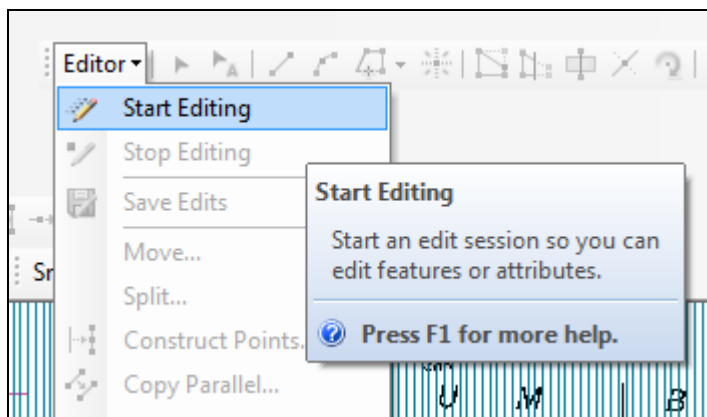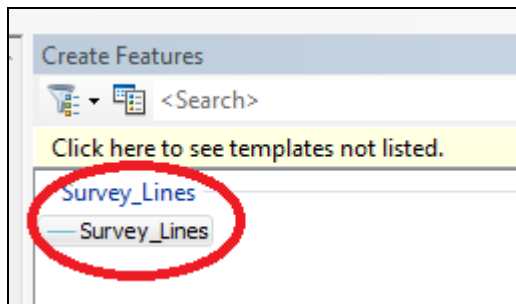Uncheck Create Label Points
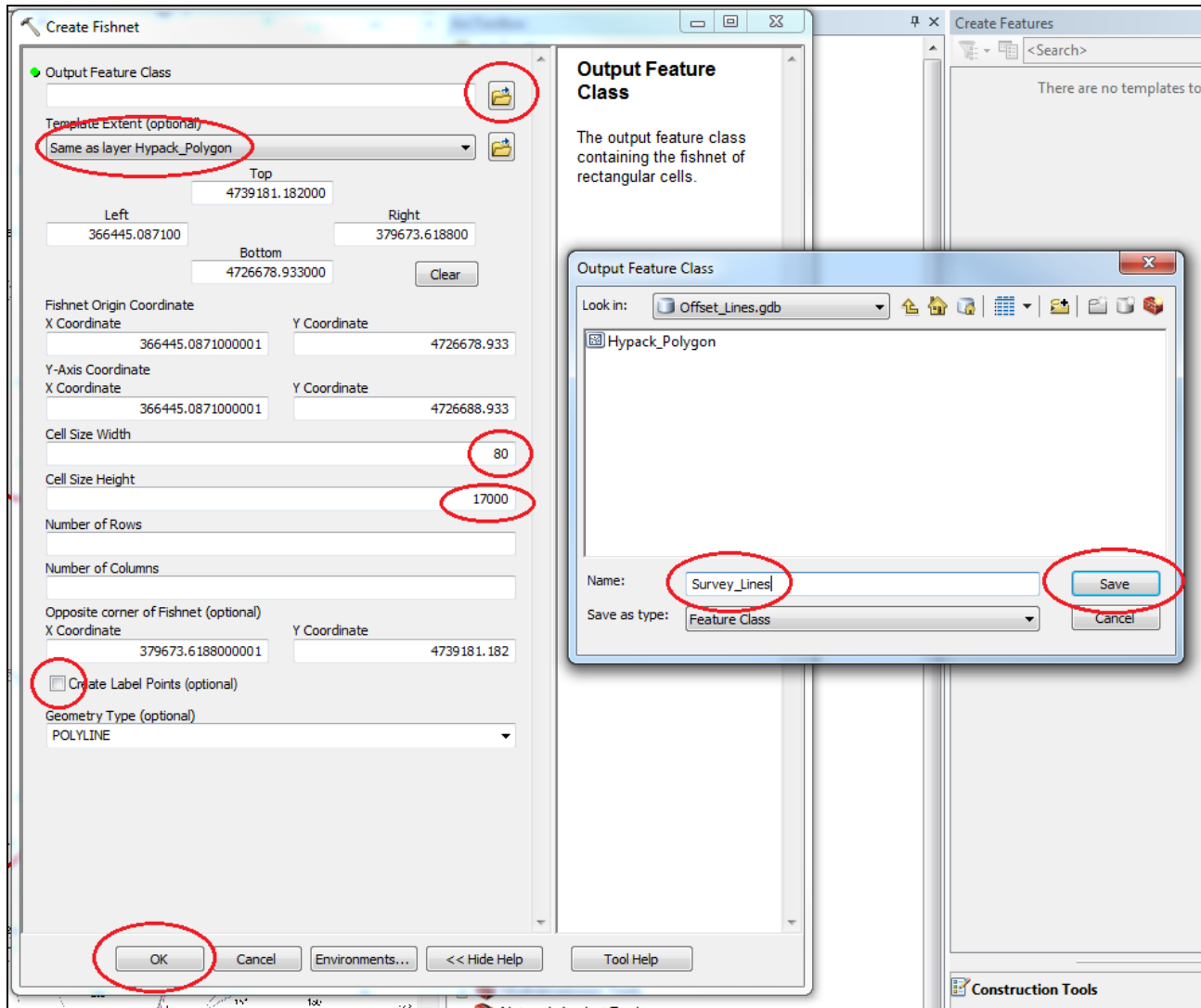


Click OK

Once the tool completes, right click on your new Survey Lines feature class →Selection→Make This The Only Selectable Layer:
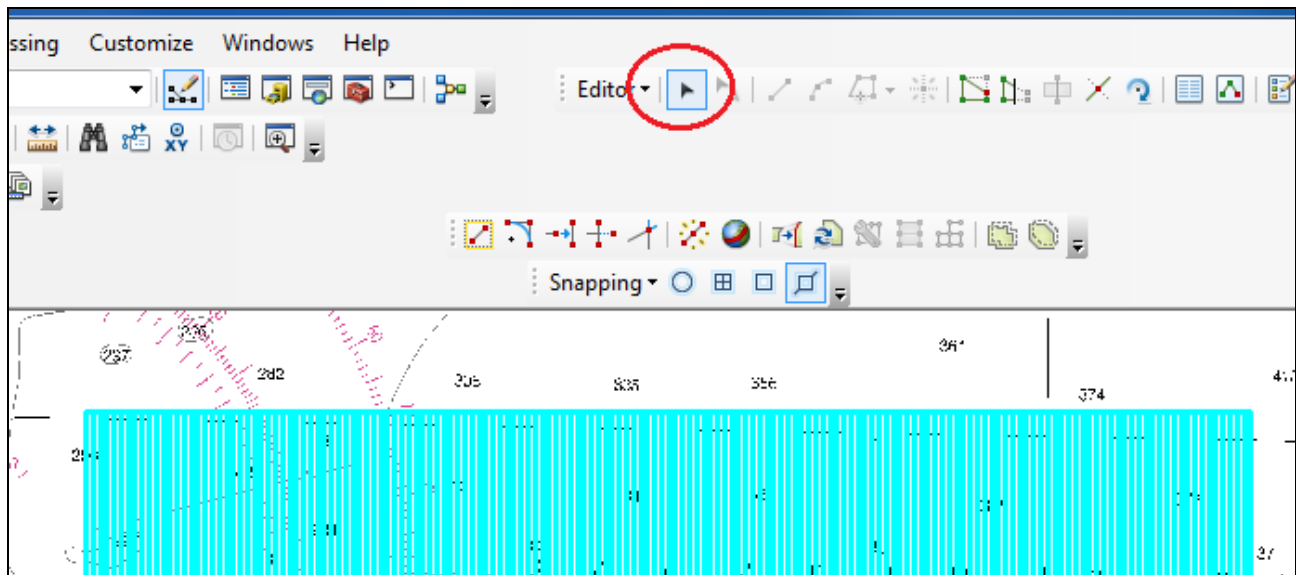


In the editing toolbar, click Start Editing:

Highlight the Survey Lines Layer in the Create Features Window:



Select all lines with the Edit Tool:



Use the Edit Tool and the Orientation Tool to drag the survey lines layer and position it optimally over the Polygon layer:

The lines are now oriented correctly.

Editor → Stop Editing →Save Edits.

*Hard Copy of this SOP is obsolete- the OCS QMS electronic procedure is valid*
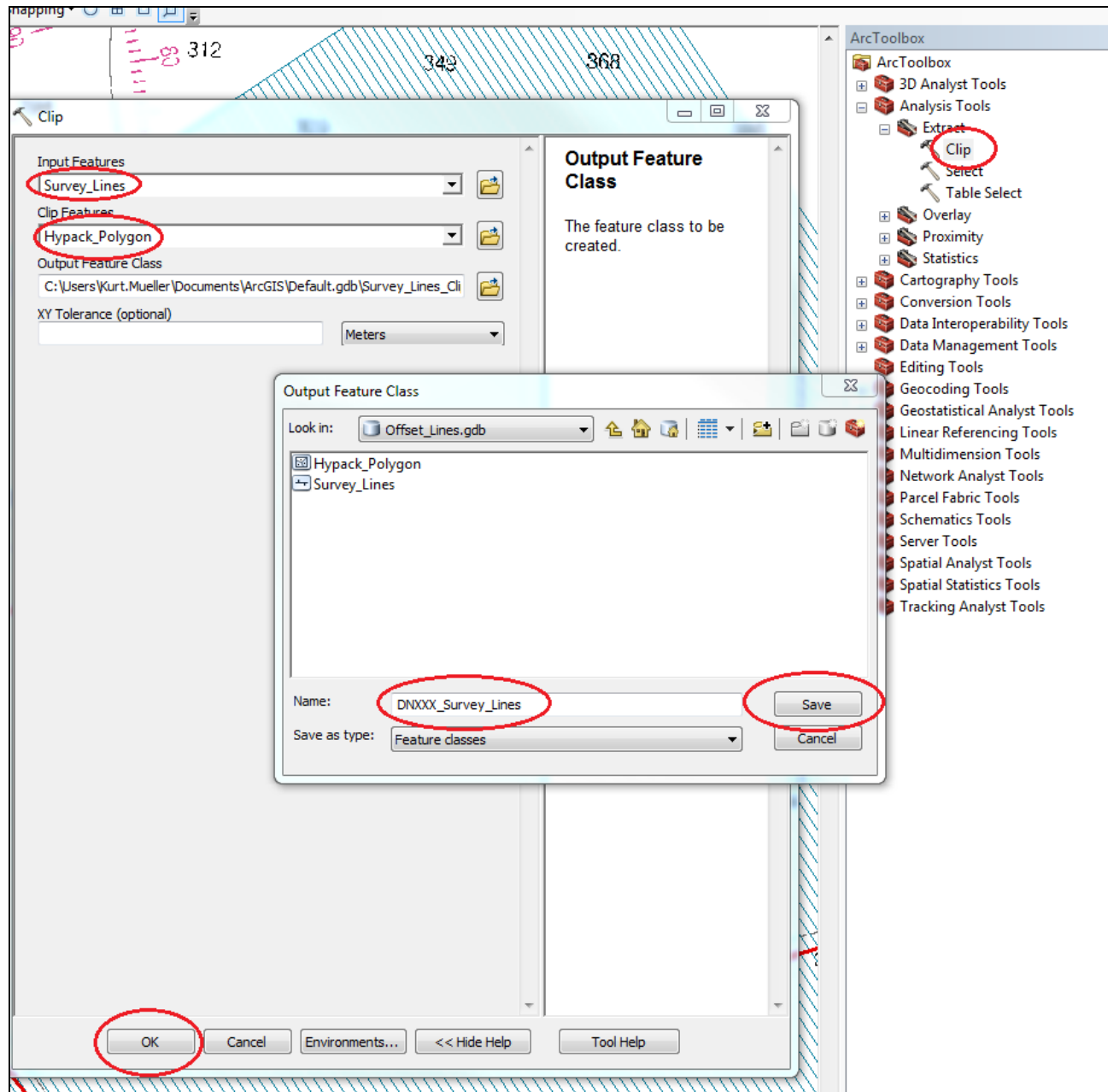
Open ArcToolbox and navigate to Analysis Tools→Extract→Clip

In the Clip Dialogue complete the following:

Input Features: Survey_Lines (the features we are clipping)
Output Feature Class: DNXXX_Survey_Lines (a new feature class that will be created after the clip is complete)
Clip Features: Polygon (the feature that we are *clipping to*)

Once the tool completes processing, turn off the Survey_Lines layer and the Polygon layer in the Table of Contents Window to view the completed line plan:
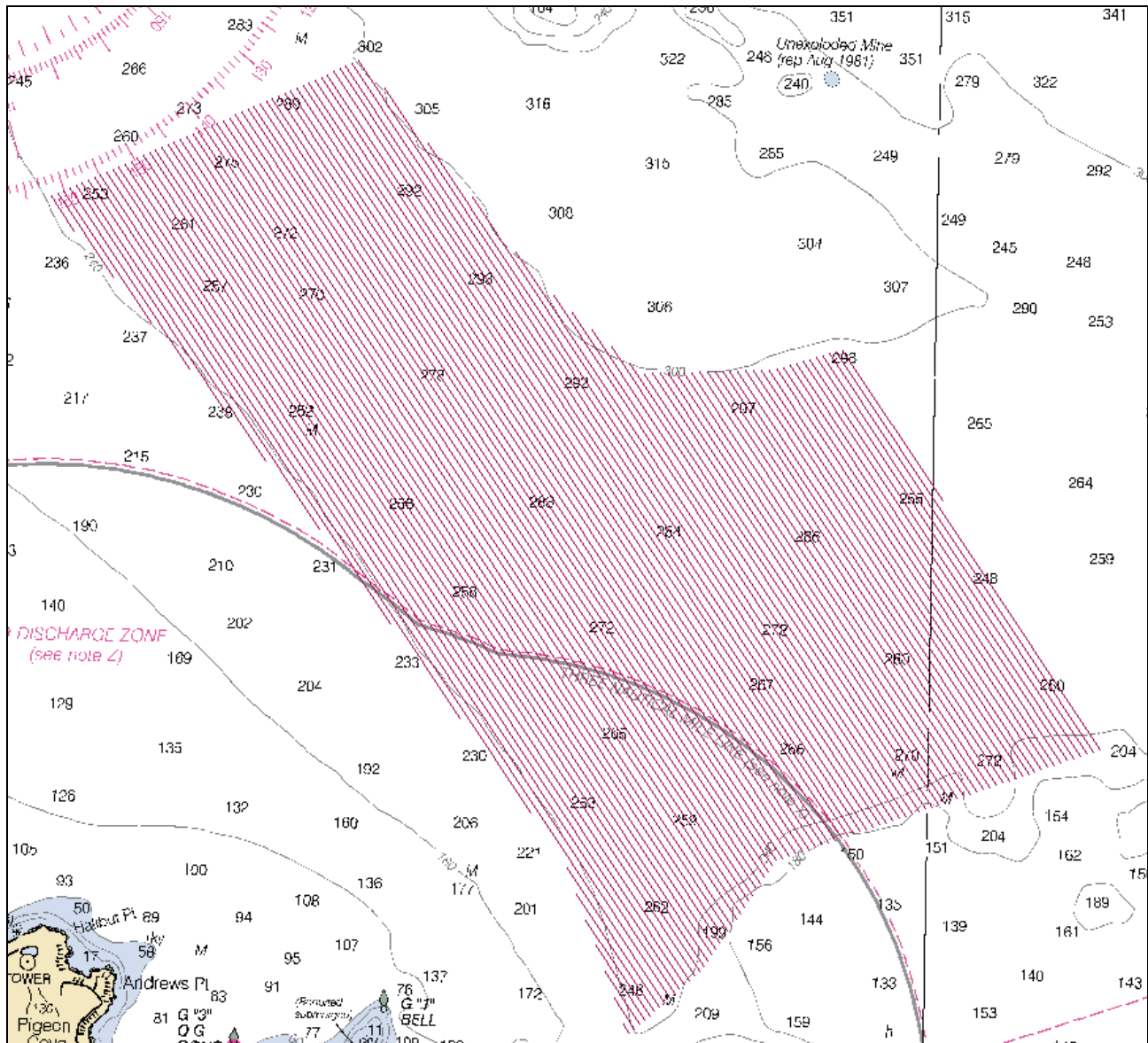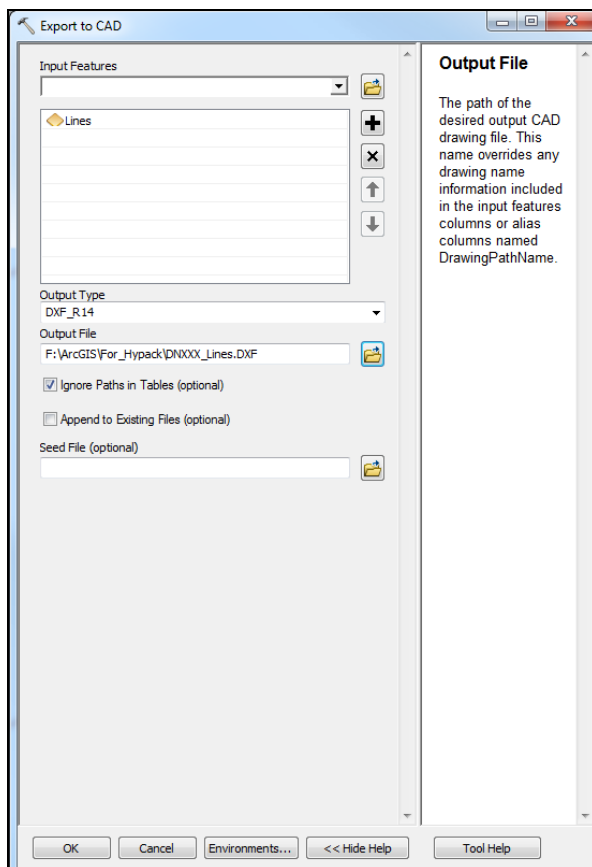
## 2.4 EXPORT TO DXF (CAD) AND CONVERT TO .LNW IN HYPACK

To Export as a DXF file for use in Hypack, highlight the DNXXX_Lines in the Layers window →Right Click →Data→Export to CAD
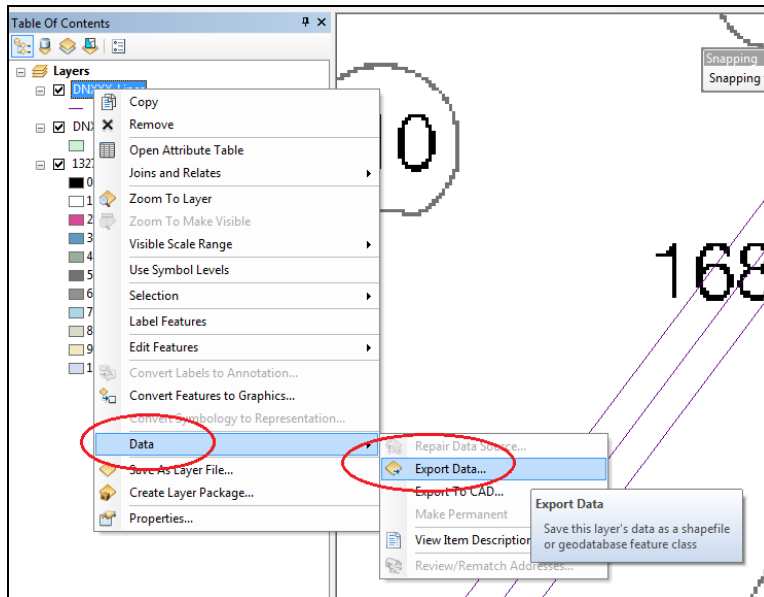


In the Export Data dialogue under output type choose DXF_R14:

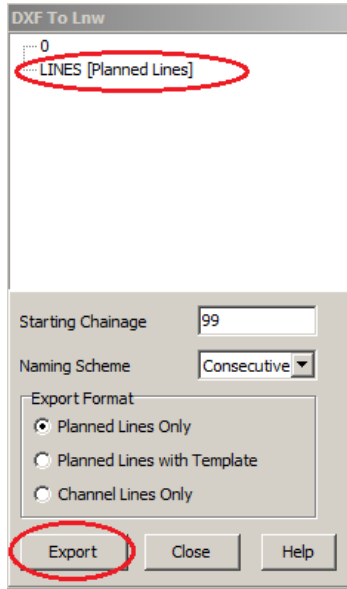*Hard Copy of this SOP is obsolete- the OCS QMS electronic procedure is valid*

Open Hypack

Add the DXF line file into the project as a background file.

Right Click →Export to LNW

In the DXF to LNW dialogue, highlight the LINES text in the upper portion of the selection window →Right Click→and choose 'planned lines' from the available categories.



The new line plan should appear in the Hypack project under the 'planned line files' category in LNW format.