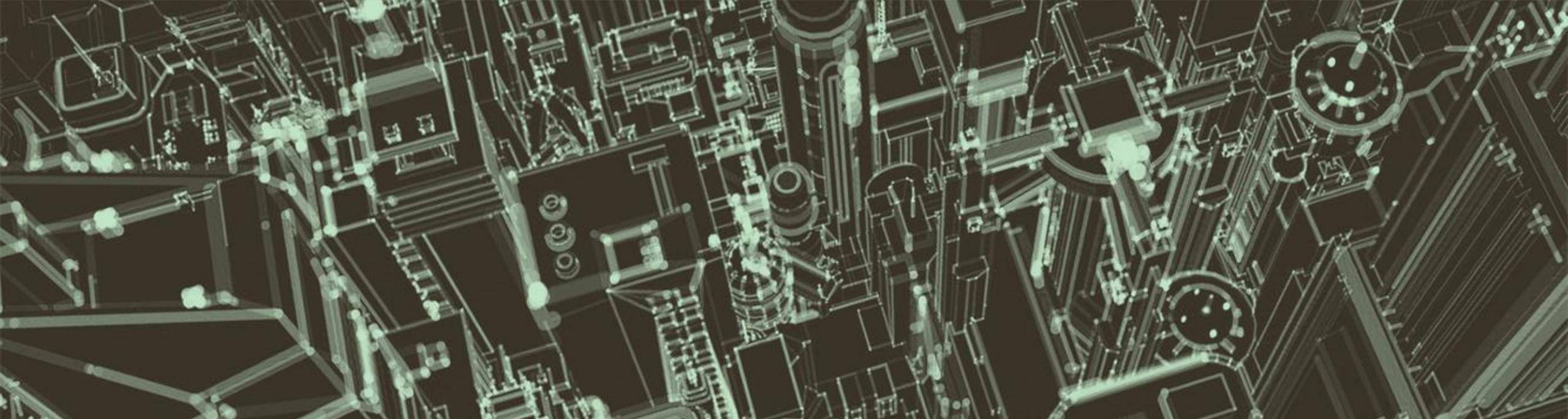


YSN RIVERS

GIS TRAINING, 16th – 18th MAY 2023

Instructor Surv. Victor Tariah *mnis*



Hands-On Exercise

Creating a Fit For Purpose LIS

DISCLAIMER:

This disclaimer applies to the GIS training program and the use of datasets and personal information therein.

1. Purpose and Scope:

This GIS training program aims to provide participants with knowledge and skills in GIS technologies and their applications. The training program may involve the use of various datasets and personal information for instructional purposes.

2. Data and Information:

The datasets used in this training program are for educational and demonstration purposes only. They may not reflect real-world data and should not be considered accurate or up-to-date. Any resemblance to actual persons, places, or organizations is purely coincidental.

3. Privacy and Confidentiality:

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4. Use of Data:

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5. Accuracy and Reliability:

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6. Limitation of Liability:

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7. Compliance with Laws:

Participants are responsible for ensuring compliance with all applicable laws, regulations, and policies related to the use, handling, and protection of data, including personal information.

By participating in this GIS training program, you acknowledge and agree to the above disclaimers and terms.

You can download a copy of the dataset used here

https://drive.google.com/file/d/1EF1JNOTw9tw0juyI0OYiq6tehnTngUvW/view?usp=share_link

For Trainings on GIS/Remote Sensing do contact the instructor via

Email: Tariahvictorconsulting@gmail.com

Phone number: 07035428495

Hypothetical Scenario

BRIEF 1

TV Consulting

You are in partnership with a Real Estate firm, as a geospatial consultant you are to assist with the following tasks.

1. Delineating their boundary
2. Parcellating their individual boundaries based on the dimensions given.
3. Generate the Coordinates of all the Pillars used.

4. Create a Quasi Desktop Land Information System for them, having the following features.
 - a. The Names of each landowner
 - b. The Areas (Sq. Km) Occupied by each occupant.
 - c. The Cost of each purchase.
 - d. The amount to be Charged is based on the Revised Scale of Fees. @ N195,000
 - e. Number of Plots occupied by each client.
 - f. Date of purchase
5. Determine the number of pillars issued to each occupant.
6. Due to the Land location, you are asked to show Properties that might be susceptible to flooding based on their slope generated and tell them the Previous activities going on the land 12 years ago i.e., 2011.
7. You were hinted by your Partner that they are intending to buy some property along the Express Road, but due to a privy information of a proposed dualization of the express road you are to determine which properties will be affected if the dualization is carried out within 30, and 60m away from the centerline.

Datasets Provided

- Imagery of the study area
- Setting out Coordinates in .csv
- Client database
- Bearing and Distances of Perimeter
- 30m SRTM DEM of the project area.

Workflow

01
STEP

Data Acquisition



02
STEP

Data Analysis/Processing



03
STEP

Data Visualization



01 STEP

Data Acquisition & Storage



GPS Observation

- Perimeter Survey
- Setting Out all Parcels
- Spot Height @10m

DEM

- SRTM 30m Resolution

Imagery

- Google Earth Imagery

Database Creation

- Geodatabase
- Shapefiles/ Feature Class
 - Perimeter
 - Pillar
 - Parcels
 - Boundary

Data Analysis/Processing



Raster analysis

- Slope Generation
- Clipping DEM

Vector Analysis

- Spot Height Value Extraction
- Selection (By Location)
- Attribute Population
- Trim/Extend

- Export to CAD, KMZ format
- Excel Analysis (Flash Fill, Text to column)
 - Other Geoprocessing Tools
 - Join Field
 - Join and Relate
 - Zonal Statistics as Table
 - Fishnet
 - Extract values to point
 - Frequency
 - Tabulate Intersection

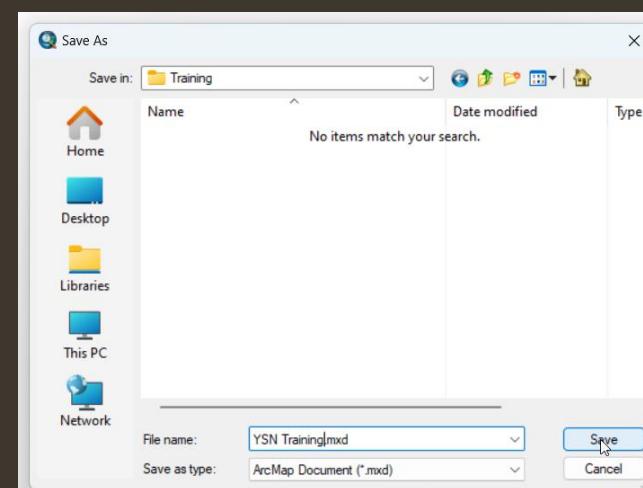
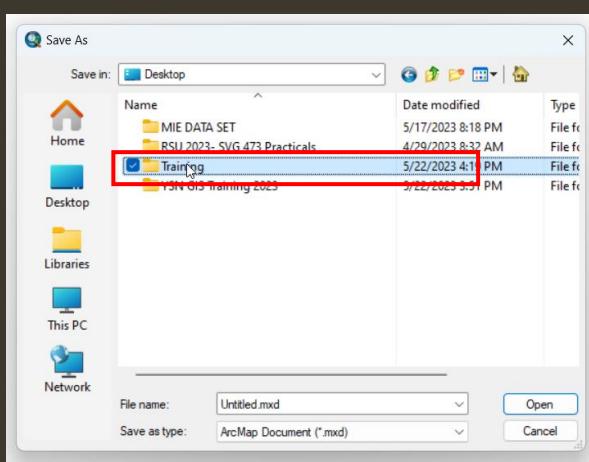
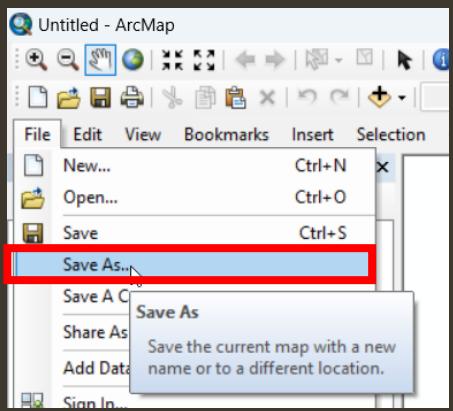
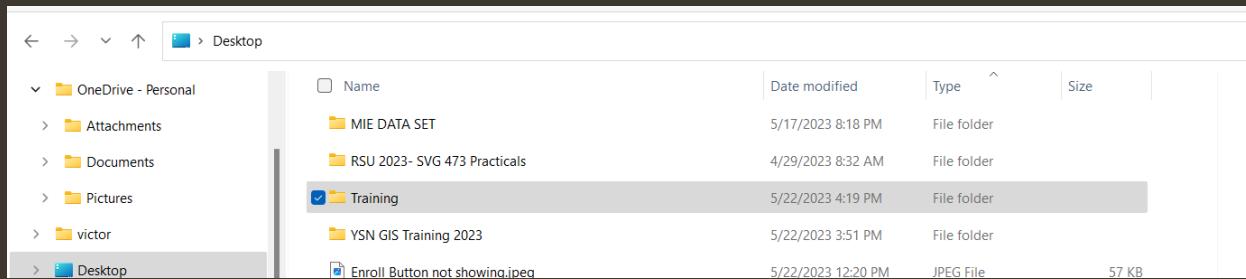
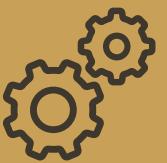
Data Analysis/Processing



List of Shapefiles to be Created

- Parcel
- Roads
- ParcelLine
- Perimeter
- Pillar

Data Analysis/Processing



- Create a Folder on your Desktop
- Select Save or Save as

Data Analysis/Processing

Creating Shapefiles – Feature Dataset

The screenshot shows the ArcGIS Catalog interface. A context menu is open over a 'File Geodatabase' item, with 'New' selected. This leads to another context menu over a 'Feature Dataset...' item, also with 'New' selected. The final step is the 'New Feature Dataset' dialog box, where the name 'YSN_Training' is entered.

New Feature Dataset

Name: YSN_Training

Choose the coordinate system that will be used for XY coordinates in this data.

Geographic coordinate systems use latitude and longitude coordinates on a spherical model of the earth's surface. Projected coordinate systems use a mathematical conversion to transform latitude and longitude coordinates to a two-dimensional linear system.

Current coordinate system:
WGS_1984 UTM Zone 32N
WKID: 32632 Authority: EPSG

Projection: Transverse_Mercator
False_Easting: 500000.0
False_Northing: 0.0
Central_Meridian: 9.0
Scale_Factor: 0.9996
Latitude_Of-Origin: 0.0
Linear Unit: Meter (1.0)

New Feature Dataset

Choose the coordinate system that will be used for Z coordinates in this data.

Vertical coordinate systems define the origin and linear unit of z coordinates. They also define the positive direction of values in order to model heights or depths.

Current coordinate system:
No coordinate system.

New Feature Dataset

XY Tolerance
The XY tolerance is the minimum distance between coordinates before they are considered equal. The XY tolerance is used when evaluating relationships between features.

0.001 Meter

Z Tolerance
0.001

M Tolerance
0.001 Unknown Units

Reset To Default About spatial reference properties

Accept default resolution and domain extent (recommended)

< Back Next > Cancel

< Back Finish > Cancel

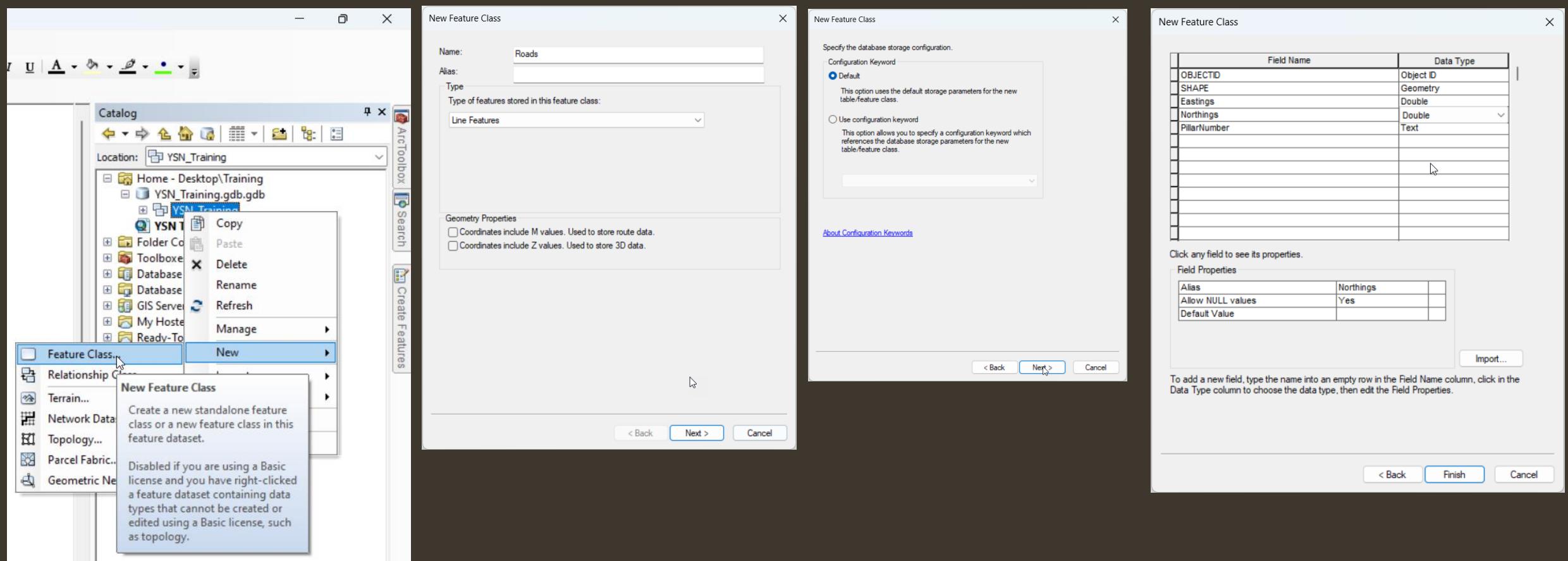
- Create a Folder on your Desktop
- Rename **New File Geodatabase.gdb** to **YSN_Training.gdb**
- Projected Coordinate System—UTM—WGS 1984—Northern Hemisphere—WGS 1984 UTM Zone 32N
- Rename **New File Geodatabase.gdb** to **YSN_Training.gdb**

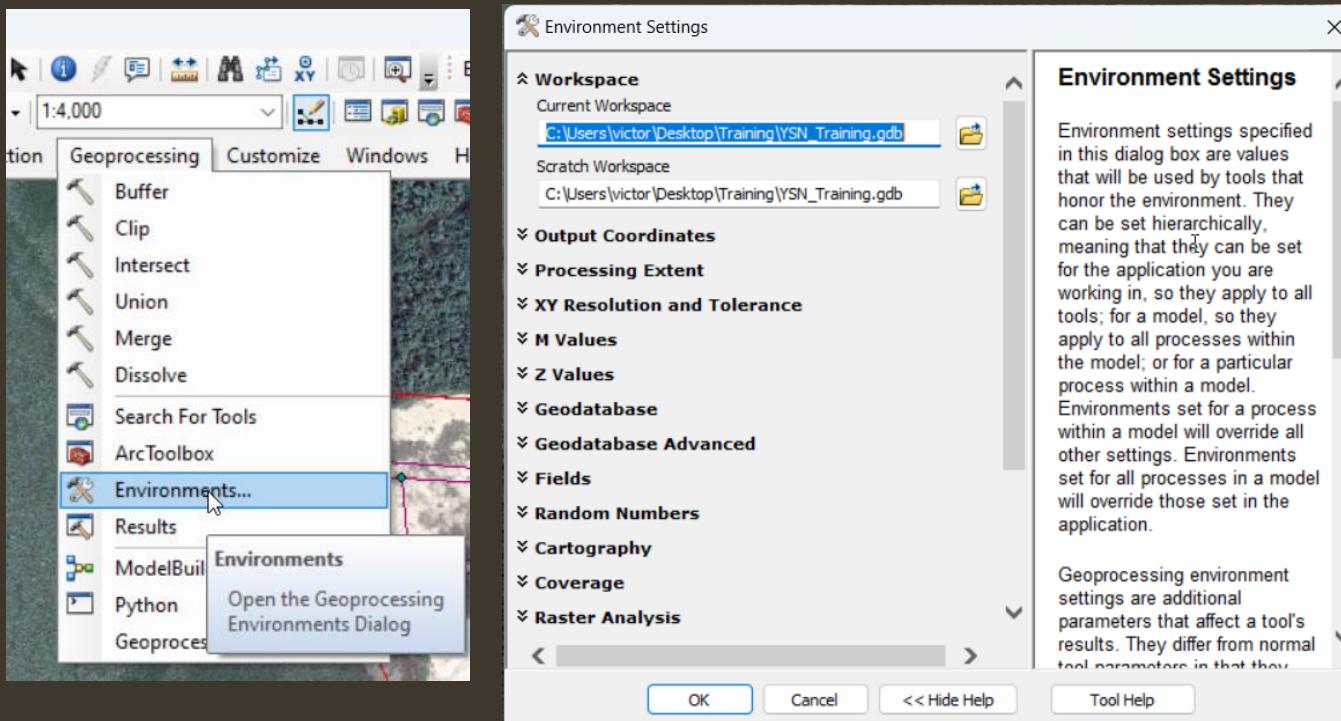
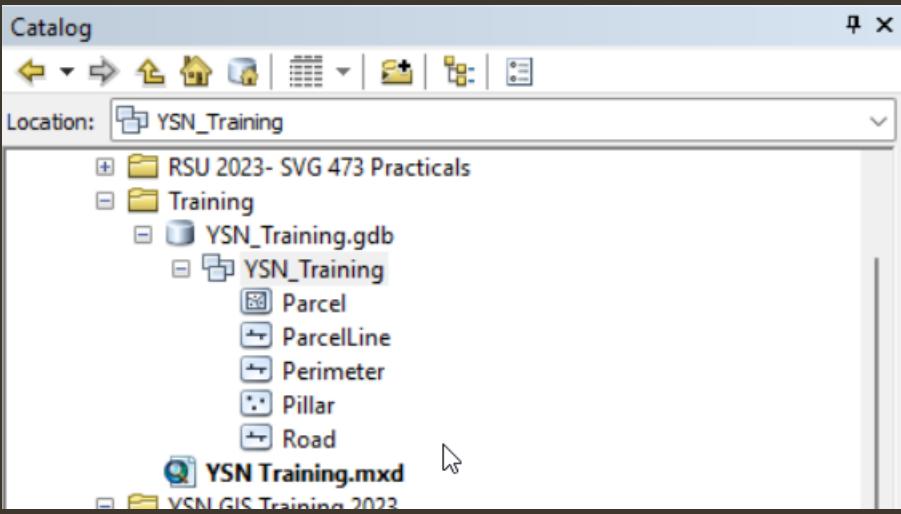
Data Analysis/Processing

Creating Shapefiles – Feature Class



- Right click on YSN_Training – Feature Class

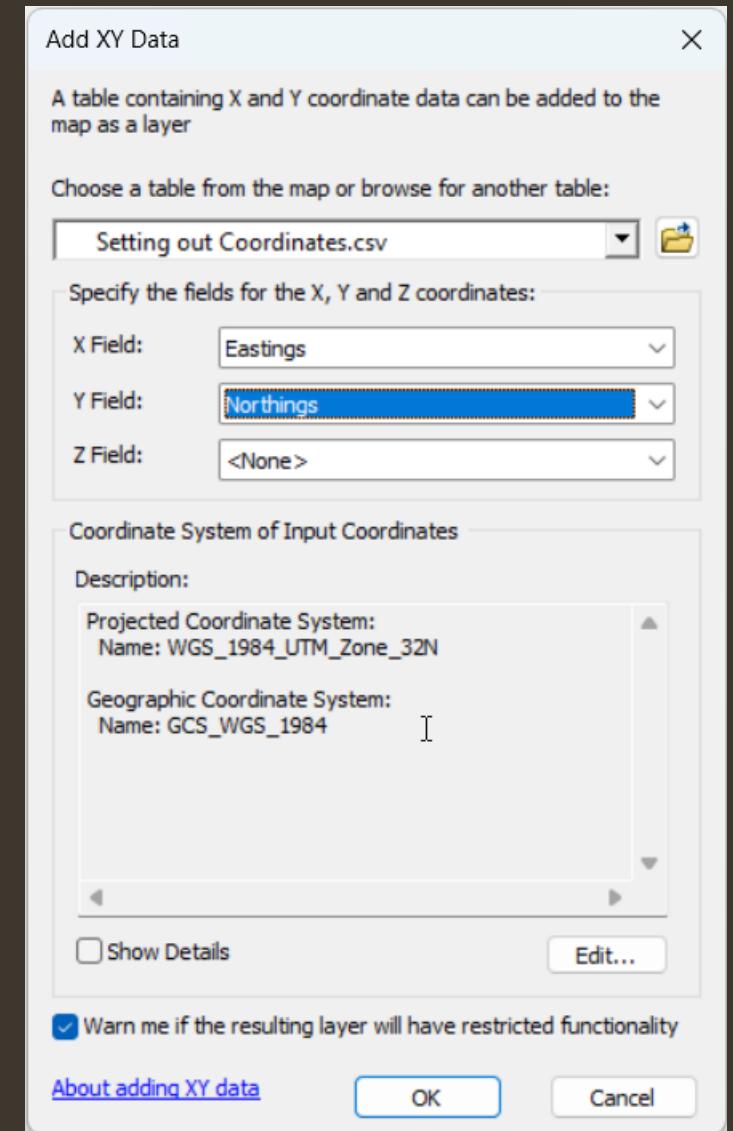
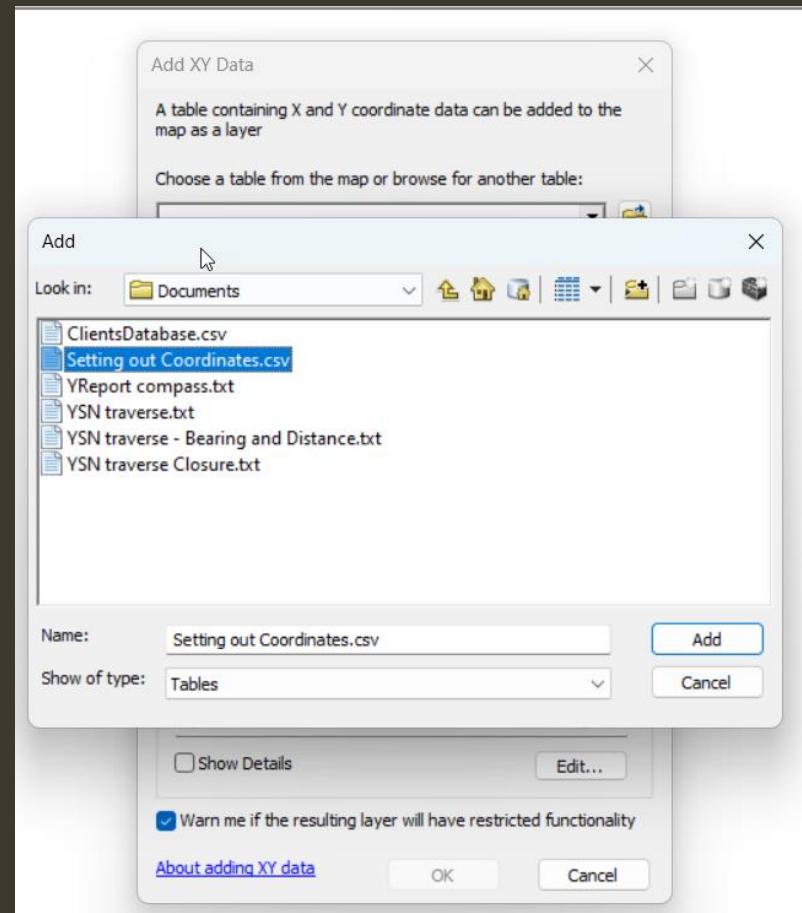
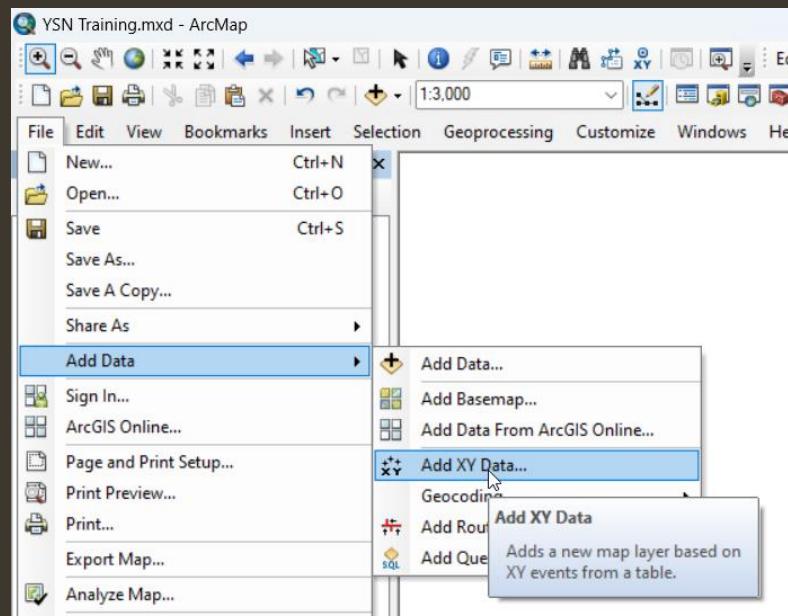




- Repeat the process for other shapefiles
- Rename **New File Geodatabase.gdb** to **YSN_Training.gdb**
- Select **Geoprocessing** from the standard Menu Bar
- Choose **Environments**
- In Environments settings, select **Workspace** and change the Current workspace to the **Training.gdb**

Data Analysis/Processing

Adding Setting-Out Coordinate



- Select **File – Add Data – Add XY Data**
- Select the **Setting out Coordinates.csv** file
- Select appropriate **Eastings** and **Northings** Values

Data Analysis/Processing

Adding Setting-Out Coordinate & Imagery



- Click on the **Add Data** Icon
- Navigate to where you saved the **Imagery.tif** file
- Select **Add**

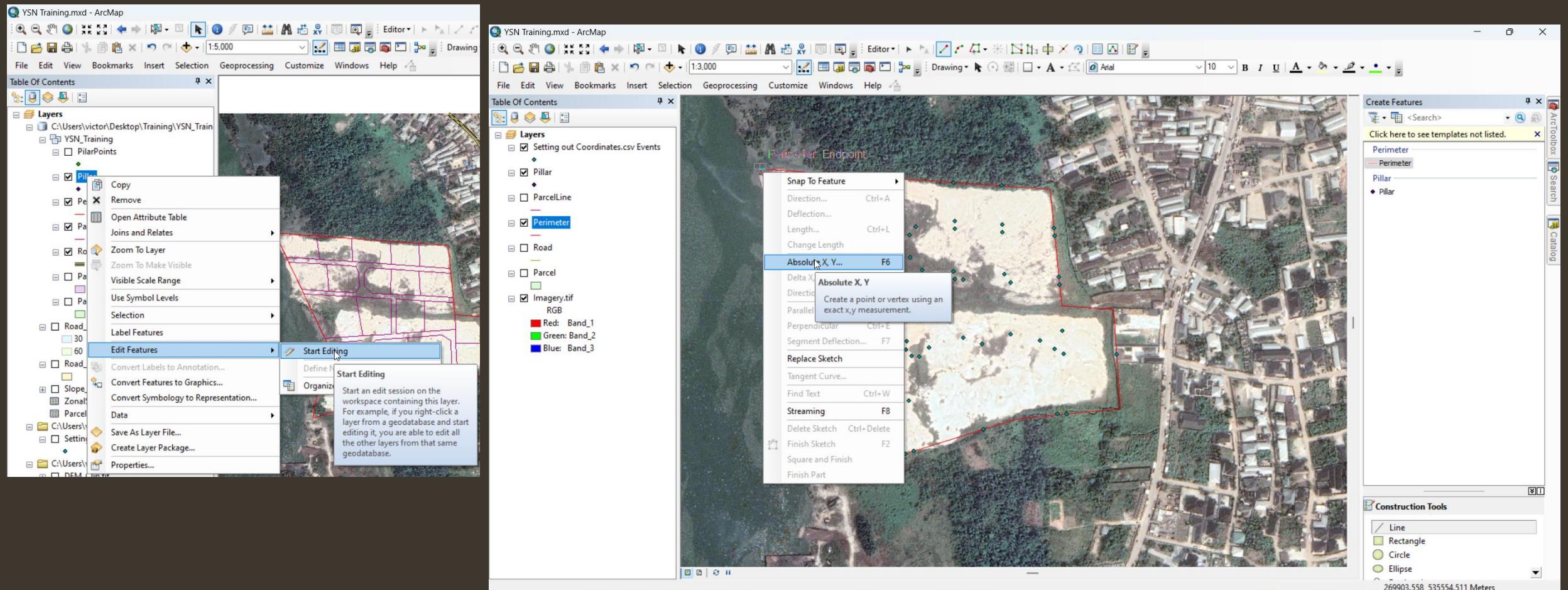
The screenshot illustrates the workflow for adding data in ArcMap:

- Left Panel:** Shows the "Add XY Data" dialog box. It displays a message about adding X and Y coordinate data from a CSV file. The file "Setting out Coordinates.csv" is selected, with "Eastings" as the X Field and "Northings" as the Y Field. A note states that the table does not have an Object-ID field, which prevents selection, querying, or editing of features.
- Middle Panel:** Shows the ArcMap interface with the "Table Of Contents" pane open. It lists several layers: "Setting out Coordinates.csv Events" (checked), "Pillar" (checked), "Parcelline" (unchecked), "Perimeter" (unchecked), "Road" (unchecked), and "Parcel" (unchecked). The "Add Data" dialog box is also visible, showing the "Raster" folder containing "DEM.tif", "DEM_Clip.tif", "DEM_Clip_Presample.tif", and "Imagery.tif". The "Imagery.tif" file is highlighted and selected.
- Right Panel:** Shows the main map view displaying a satellite imagery layer. Overlaid on the imagery are numerous small green dots representing the "Setting out Coordinates" data points. A legend on the right side of the map view shows the "Imagery.tif" layer with three color-coded bands: Red: Band_1, Green: Band_2, and Blue: Band_3.

Data Analysis/Processing Delineating the Perimeter



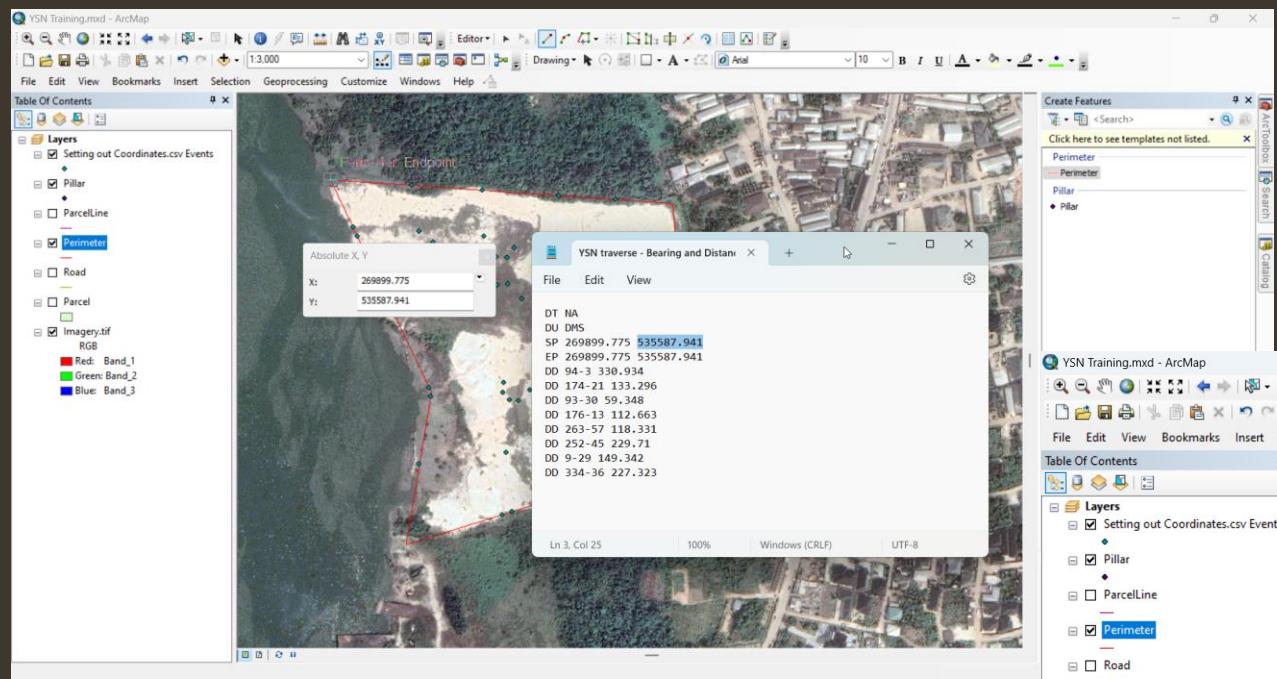
- Right click on Pillar Feature Class – Edit Features – Start Editing
- Select Pillar from the Create Features Tab
- Right Click on the Map Canvas
- Select Absolute X, Y



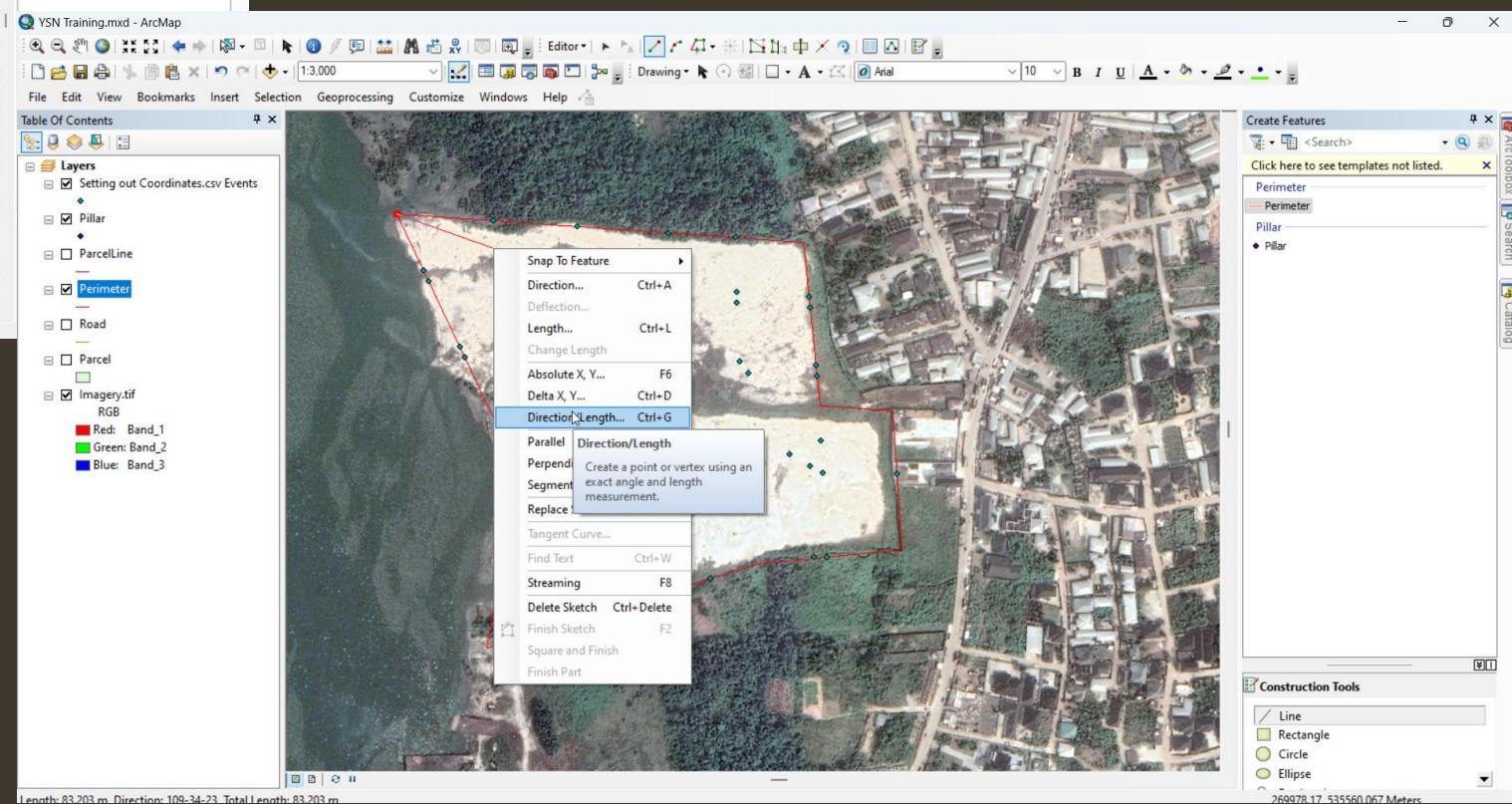
Data Analysis/Processing Delineating the Perimeter



- Right Click on the Map canvas
- Select **Direction Length**
- Input the **Bearing** and **Distances** Provided
- Press the **Enter Key**
- Repeat for all other Traverse



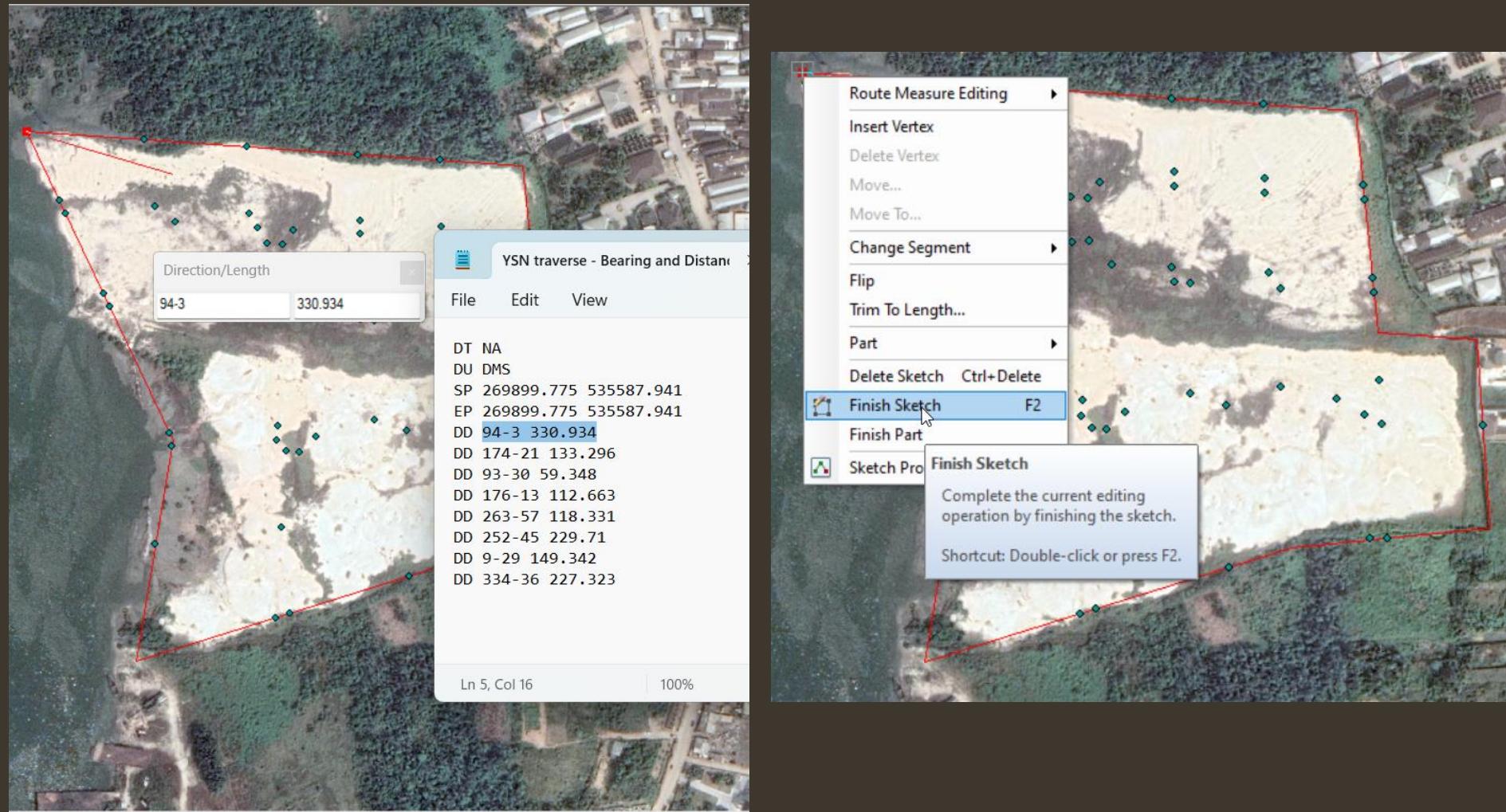
- Input the **SP (Start Point)**
Eastings and **Northings**
Coordinates provided
- Press the **Enter Key**



Data Analysis/Processing Delineating the Perimeter



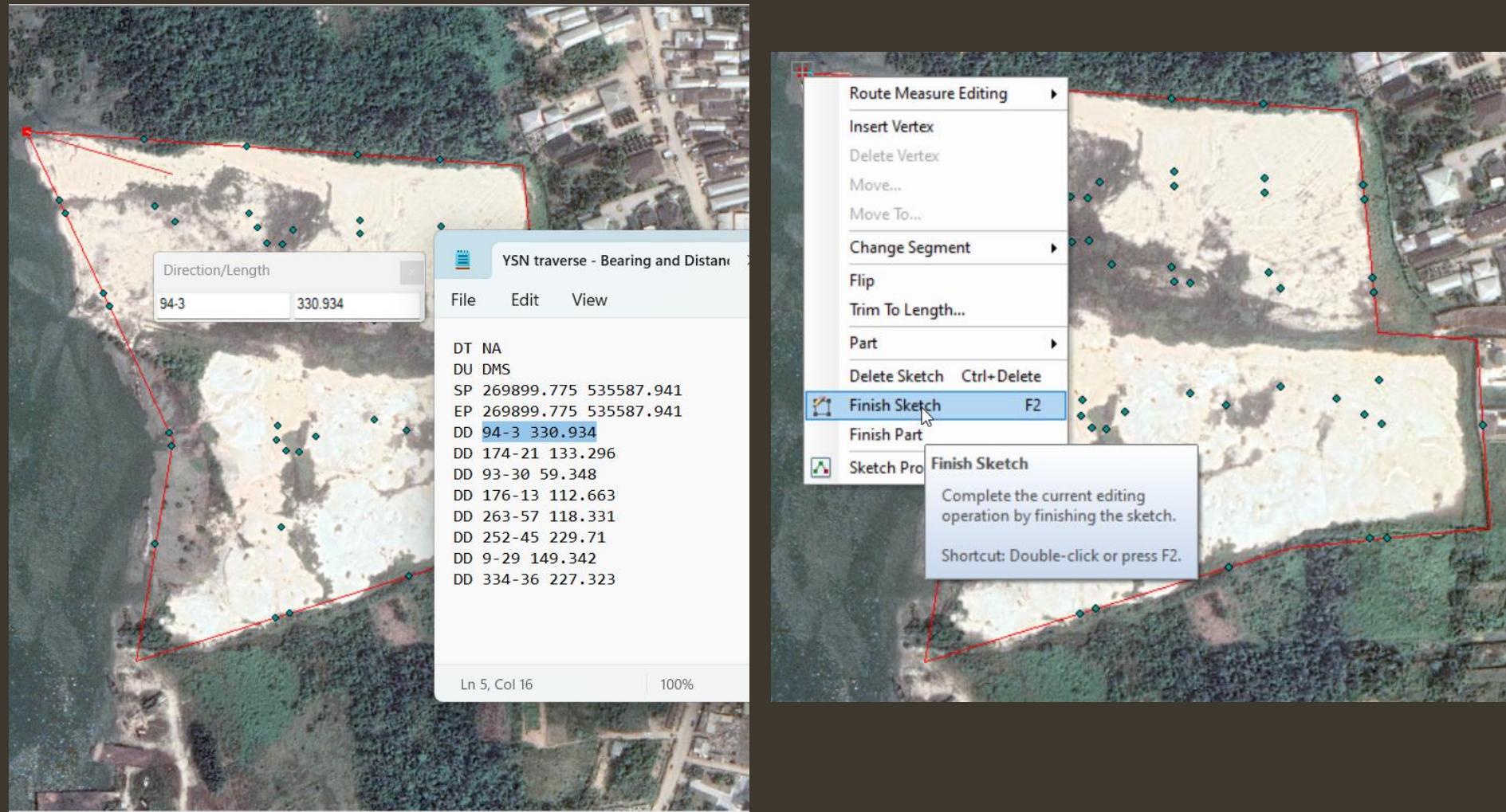
- Input the Bearing and distances for each traverse
- Right click and select Finish Sketch after inputting the last bearing and distance



Data Analysis/Processing Delineating the Perimeter



- Input the Bearing and distances for each traverse
- Right click and select Finish Sketch after inputting the last bearing and distance



Data Analysis/Processing

Exporting the Event file into shapefile



- Right click on **Setting out Coordinates.csv Events** file
- Select Data – Export Data
- Change the “*Export Data*” name to **PillarPoint**
- Select add to layer option
- Digitize the Boundary Coordinates and edit the **Pillar_Number** field.
- Populate the Eastings & Northings field by using the **Calculate Field Geometry** icon from the attribute table

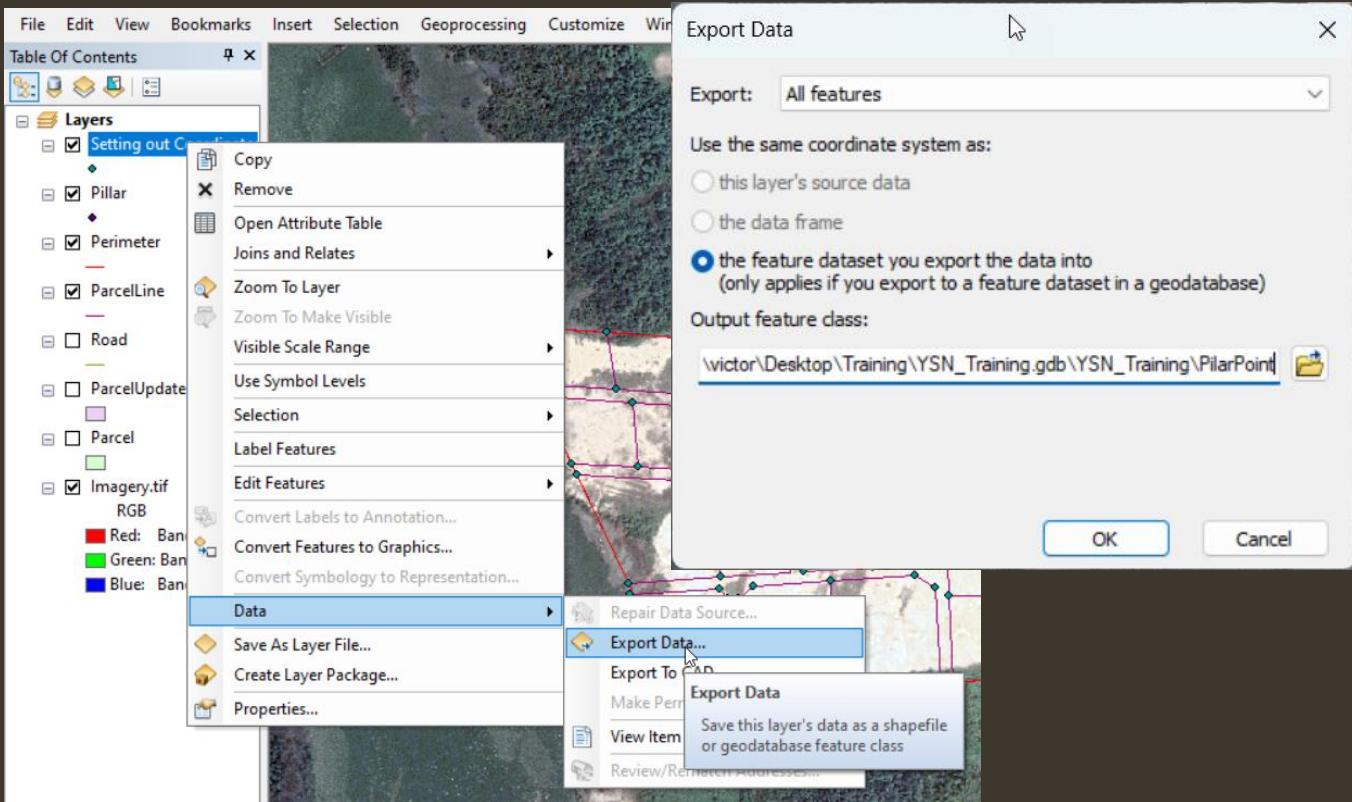
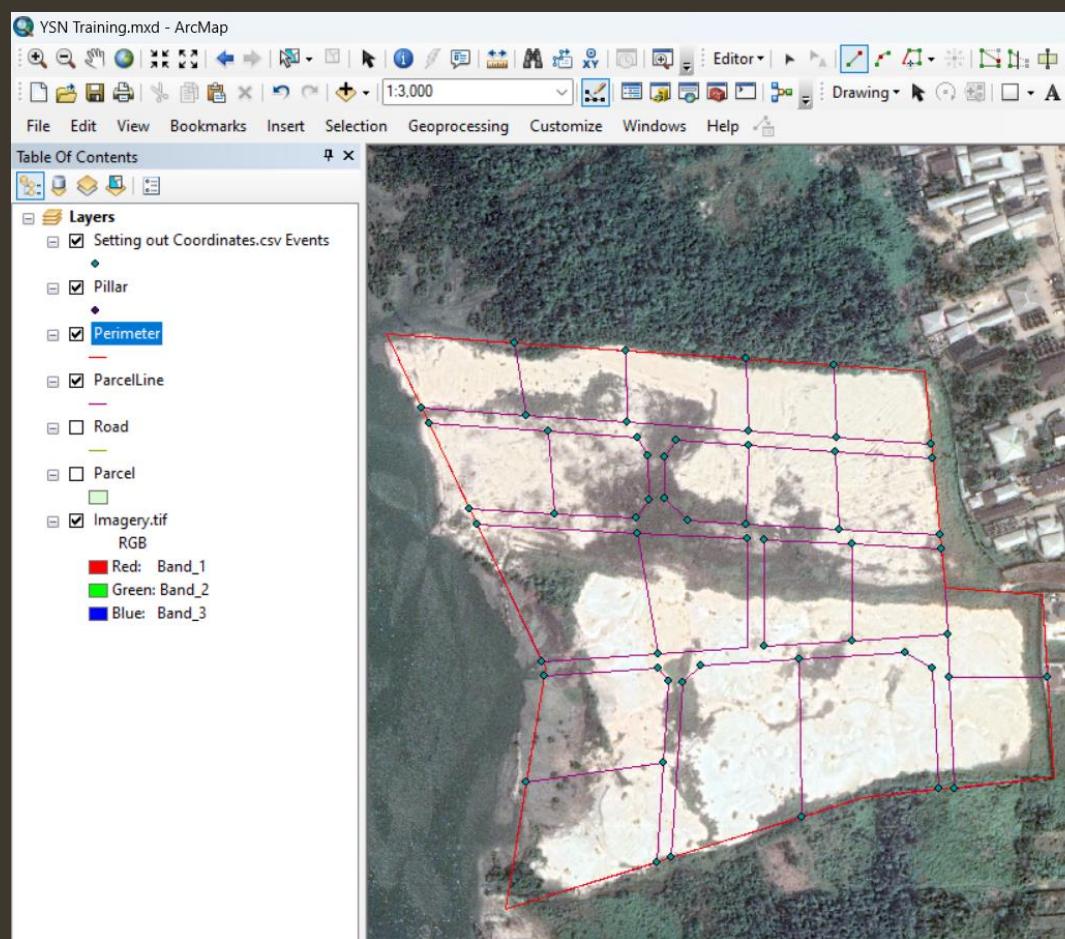
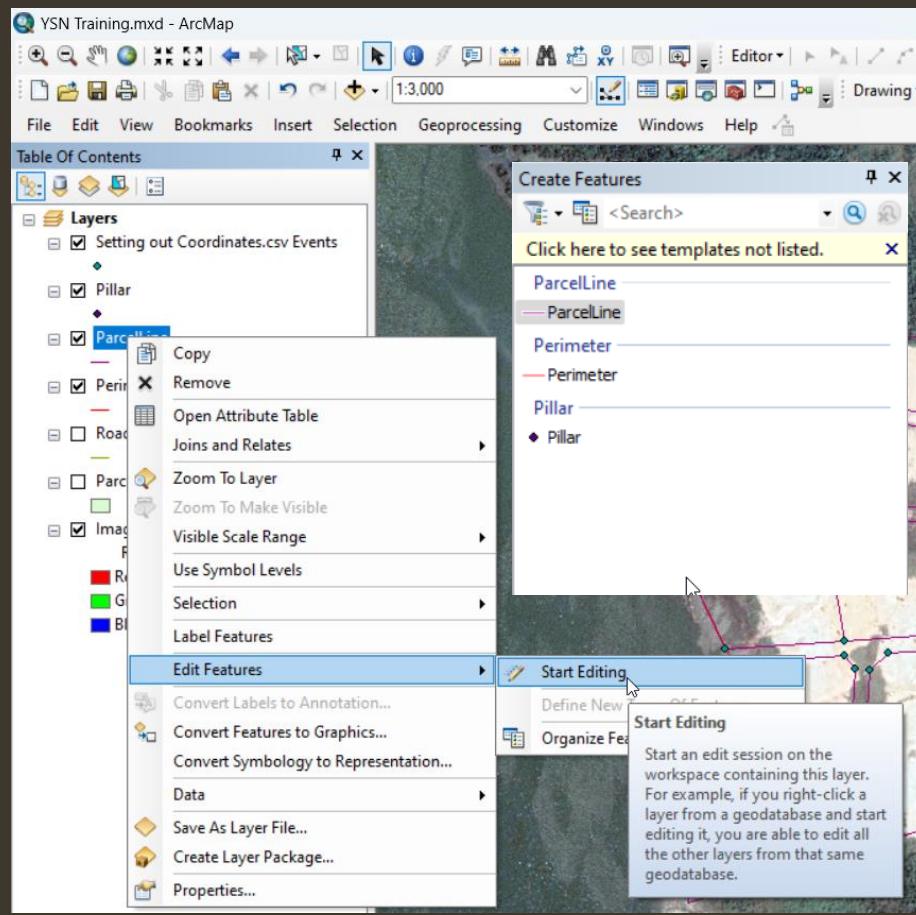


Table					
OBJECTID *	SHAPE *	Pilar_Prefix	Eastings	Northings	Pilar_Number
1	Point	RV/SC	<Null>	<Null>	1121
2	Point	RV/SC	<Null>	<Null>	1122
3	Point	<Null>	<Null>	<Null>	1123
4	Point	<Null>	<Null>	<Null>	1124
5	Point	<Null>	<Null>	<Null>	1125
6	Point	<Null>	<Null>	<Null>	1126
7	Point	<Null>	<Null>	<Null>	1127
8	Point	<Null>	<Null>	<Null>	1128
9	Point	P	270234.244	535520.4479	1
10	Point	P	270176.0351	535524.4834	2
11	Point	P	270174.8672	535568.4772	3
12	Point	P	270122.0717	535528.2246	4
13	Point	P	270120.5978	535572.3056	5
14	Point	P	270047.8549	535533.3699	6
15	Point	P	269985.597	535537.6861	7
16	Point	P	269978.526	535582.365	8
17	Point	P	270046.4727	535577.554	9
18	Point	P	269921.5124	535542.1289	10
19	Point	P	269925.9386	535532.8005	11
20	Point	P	269998.7462	535527.7528	12
21	Point	P	270053.9277	535523.9273	13
22	Point	P	270060.2763	535513.0098	14
23	Point	P	270060.6626	535485.9061	15

Data Analysis/Processing Delineating the individual Parcels



- Use the **ParcelLine** feature class to digitize the individual plots. Right Click on the **ParcelLine** features class
- Select the **ParcelLine** feature class from the **Create Features** panel
- Digitize the individual Parcels using the **Setting-out Coordinates** as Guide

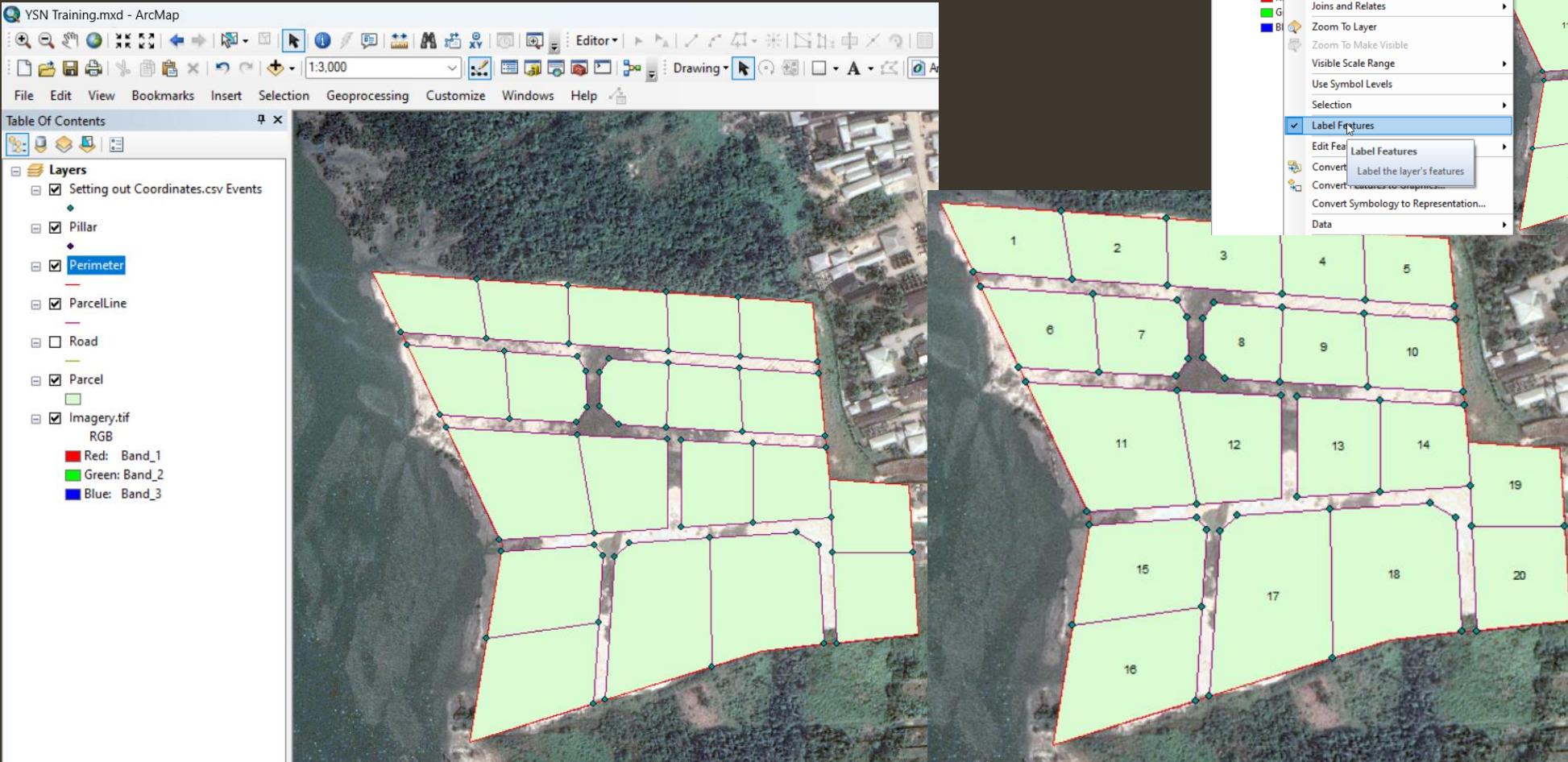


Data Analysis/Processing

Delineating the individual Parcels



- Use the **Parcel** feature class to digitize the individual plots.
- Right Click on the **Parcel** features class
- Select the **Parcel** feature class from the Create Features panel
- Digitize the individual Parcels using the Setting-out Coordinates, Ensure you number the PlotNo appropriately.
- Right Click on the **Parcel** features class Select Label features



N.B. Should it label any other field other than the pillar number,

- Right click on Parcels – Properties – Labels Tab – Check Label features in this Layer – In the Label field, Select PillarNumber

Data Analysis/Processing

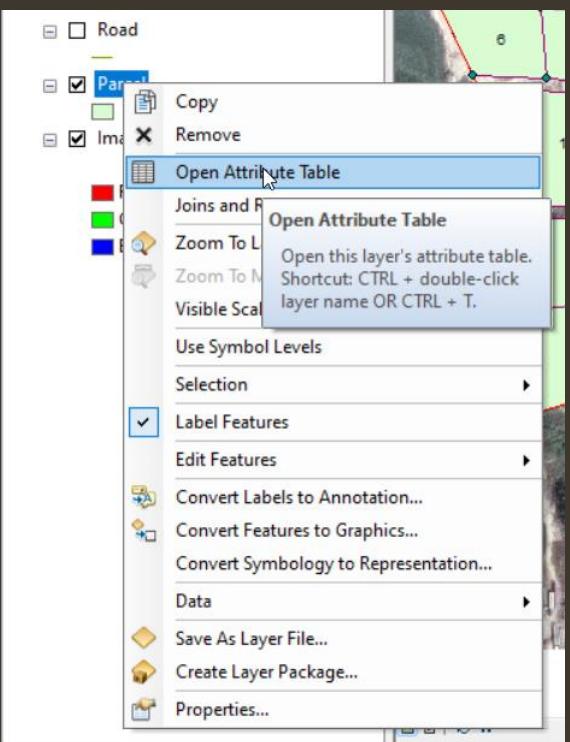
Checking the Attribute table for the individual Parcels



- Right Click on the **Parcel** features class
Select **Open attribute Table**

The screenshot shows the ArcGIS Pro interface. On the left, the Table Of Contents pane displays layers including 'Setting out Coordinates.csv Events', 'Pillar', 'Perimeter', 'Parcelline', 'Road', 'Parcel' (selected), and 'Imagery.tif'. The main view shows a satellite map with a polygon layer divided into 20 numbered parcels. An attribute table titled 'Parcel' is open in the center, listing fields: OBJECTID*, SHAPE*, PlotNo, AmountCharged, No_Plots, SHAPE_Length, and SHAPE_Area. The table contains 20 rows of data corresponding to the parcels. A status bar at the bottom indicates '1 out of 20 Selected'.

OBJECTID*	SHAPE*	PlotNo	AmountCharged	No_Plots	SHAPE_Length	SHAPE_Area
1	Polygon	1	<Null>	<Null>	239.136916	3159.45501
2	Polygon	2	<Null>	<Null>	219.947936	2872.8626
3	Polygon	3	<Null>	<Null>	237.029475	3266.31075
4	Polygon	4	<Null>	<Null>	196.440731	2373.9362
5	Polygon	5	<Null>	<Null>	202.044453	2487.054098
6	Polygon	6	<Null>	<Null>	234.408457	3169.6758
7	Polygon	7	<Null>	<Null>	208.792385	2868.8893
8	Polygon	8	<Null>	<Null>	185.672363	2328.54045
9	Polygon	9	<Null>	<Null>	206.737573	2645.51045
10	Polygon	10	<Null>	<Null>	215.599618	2829.716
11	Polygon	11	<Null>	<Null>	338.777875	6724.17885
12	Polygon	12	<Null>	<Null>	264.662329	4312.664468
13	Polygon	13	<Null>	<Null>	232.662682	3359.4654
14	Polygon	14	<Null>	<Null>	225.643214	3190.94038
15	Polygon	15	<Null>	<Null>	280.549327	4855.8119
16	Polygon	16	<Null>	<Null>	321.488176	5946.750501
17	Polygon	17	<Null>	<Null>	363.420219	7948.46955
18	Polygon	18	<Null>	<Null>	341.843132	7293.848483
19	Polygon	19	<Null>	<Null>	225.70233	3159.173871
20	Polygon	20	<Null>	<Null>	250.576281	3914.49357

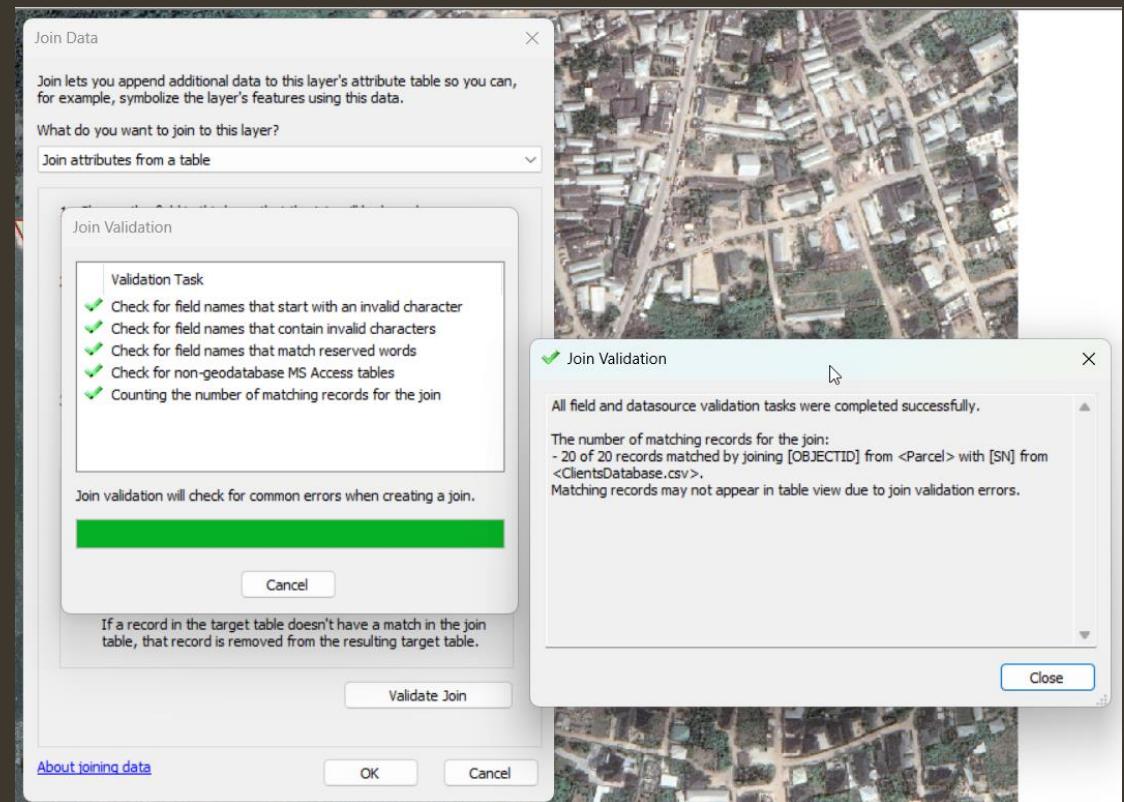
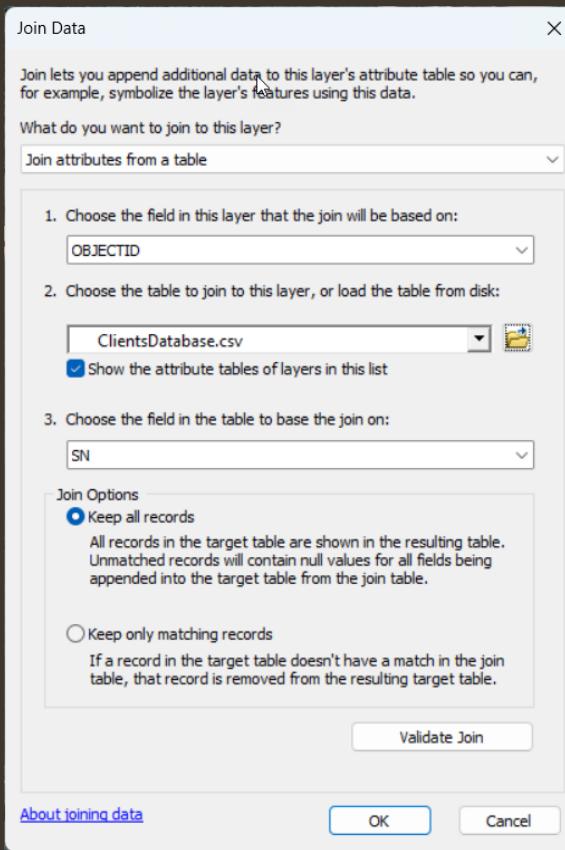
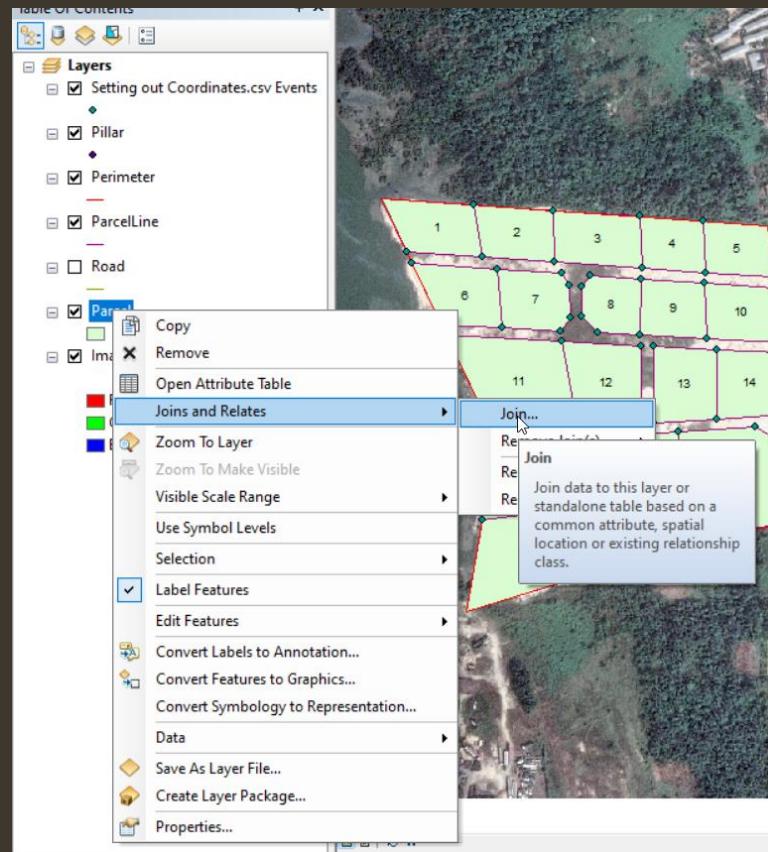


Data Analysis/Processing

Adding the ClientDatabase to the Parcels Shapefile



- Right Click on the **Parcel** features class
Select **Join and Relates**
- **Input all records**
- Select **Validate Join**
- Select **close**



Data Analysis/Processing

View the Attribute table of the Parcels Shapefile



- Right Click on the **Parcel** features class
Select **Open attribute Table**

The screenshot shows a satellite map of a residential area in Port Harcourt, Nigeria. The map displays several parcels, each labeled with a number from 1 to 19. A context menu is open over parcel 1, with the option 'Open Attribute Table' highlighted. To the right of the map, the attribute table for the 'Parcel' layer is displayed, showing 20 records. The table includes columns for PlotNo, AmountCharged, No_Plots, SHAPE_Length, SHAPE_Area, SN, FirstName, LastName, Date_of_Purchase, Amount_Purchased, CompletedPayment, PaymentType, PhoneNumber, Sex, Address, and Plot.

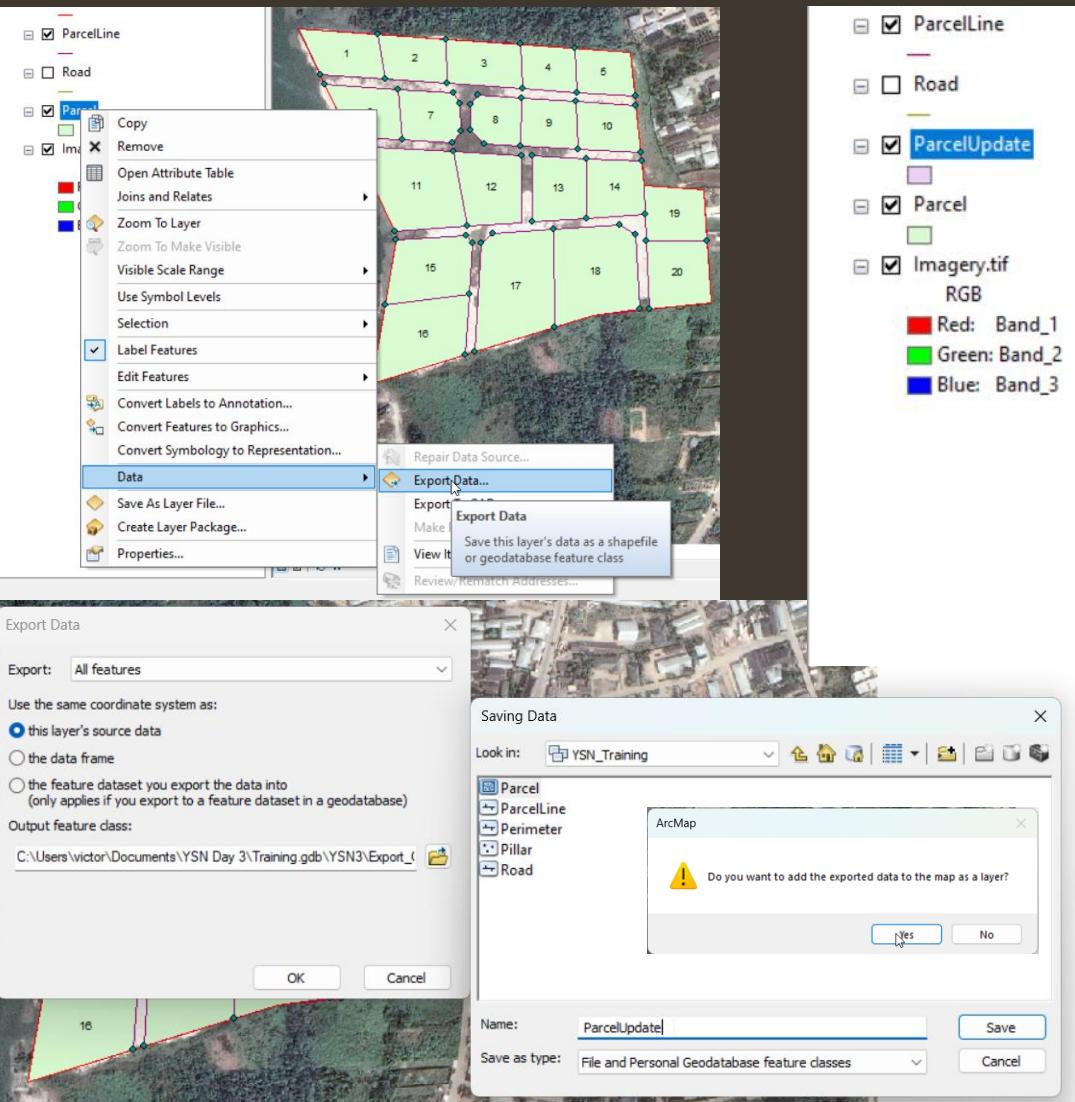
PlotNo	AmountCharged	No_Plots	SHAPE_Length	SHAPE_Area	SN	FirstName	LastName	Date_of_Purchase	Amount_Purchased	CompletedPayment	PaymentType	PhoneNumber	Sex	Address	Plot
1	<Null>	<Null>	239.136916	3159.45501	1	Amina	Yusuf	6/12/2022	500000	YES	Full Payment	2350000000000	F	123 Abua Street, Port Harcourt	
2	<Null>	<Null>	219.947936	2872.8626	2	Ibrahim	Lawal	3/18/2023	850000	YES	Full Payment	2350000000000	M	456 ABC Road, Port Harcourt	
3	<Null>	<Null>	237.029475	3266.31075	3	Ngozi	Eze	9/5/2021	1200000	YES	Full Payment	2350000000000	F	789 BUA Avenue, Port Harcourt	
4	<Null>	<Null>	196.440731	2373.9362	4	Chinedu	Okonkwo	1/30/2023	620000	YES	Full Payment	2350000000000	M	321 LNG Close, Port Harcourt	
5	<Null>	<Null>	202.044453	2487.054098	5	Fatima	Abdullahi	11/22/2022	430000	YES	Full Payment	2350000000000	F	654 Cocaine Lane, Port Harcourt	
6	<Null>	<Null>	234.408457	3169.6758	6	Abdul	Bello	4/10/2023	780000	NO	Installment	2350000000000	M	987 Beauty Street, Port Harcourt	
7	<Null>	<Null>	208.792385	2868.8893	7	Funke	Adekuunle	7/17/2022	350000	NO	Installment	2350000000000	F	789 Port Avenue, Port Harcourt	
8	<Null>	<Null>	185.672363	2328.54045	8	Chukwudi	Okafor	12/8/2021	960000	NO	Installment	2350000000000	M	234 RST Road, Port Harcourt	
9	<Null>	<Null>	206.737573	2645.51045	9	Aisha	Ibrahim	2/14/2023	680000	NO	Installment	2350000000000	F	567 Uniben Close, Port Harcourt	
10	<Null>	<Null>	215.599618	2829.716	10	Yakubu	Adamu	10/3/2022	470000	NO	Installment	2350000000000	M	432 Gombe Street, Port Harcourt	
11	<Null>	<Null>	338.777875	6724.17885	11	Halima	Mohammed	5/5/2023	1050000	YES	Full Payment	2350000000000	F	876 Obi Road, Port Harcourt	
12	<Null>	<Null>	264.662329	4312.664468	12	Musa	Sani	8/20/2022	720000	YES	Full Payment	2350000000000	M	345 Mark Close, Port Harcourt	
13	<Null>	<Null>	232.662682	3359.4654	13	Ada	Nwosu	11/15/2021	590000	YES	Full Payment	2350000000000	F	678 Tom-Dick Avenue, Port Harcourt	
14	<Null>	<Null>	225.643214	3190.94038	14	Emeka	Okeke	3/5/2023	320000	YES	Full Payment	2350000000000	M	901 Crown Street, Port Harcourt	
15	<Null>	<Null>	280.549327	4855.8119	15	Nneka	Okafor	12/28/2022	910000	YES	Full Payment	2350000000000	F	123 Peter Street, Port Harcourt	
16	<Null>	<Null>	321.488176	5946.750501	16	Usman	Aliyu	1/10/2023	450000	YES	Full Payment	2350000000000	M	456 Johnson Road, Port Harcourt	
17	<Null>	<Null>	363.420219	7948.46955	17	Bola	Adeleke	9/13/2022	650000	NO	Installment	2350000000000	F	123 New market Street, Port Harcourt	
18	<Null>	<Null>	341.843132	7293.848483	18	Abdulrahman	Dauda	10/24/2021	820000	NO	Installment	2350000000000	M	456 Refinery Road, Port Harcourt	
19	<Null>	<Null>	225.70233	3159.173871	19	Nkechi	Obi	4/16/2023	390000	YES	Full Payment	2350000000000	F	789 Hospital Avenue, Port Harcourt	
20	<Null>	<Null>	250.576281	3914.49357	20	Idris	Ibrahim	7/1/2022	1100000	YES	Full Payment	2350000000000	M	654 Gift Lane, Port Harcourt	

Data Analysis/Processing

Exporting the updated Parcels Shapefile



- Right Click on the **Parcel** features class
Select Data – Export Data
- Located the **Training.gdb** Geodatabase created
- Save the file as **ParcelUpdate**
- Add the Export to the Map Canvas



Table

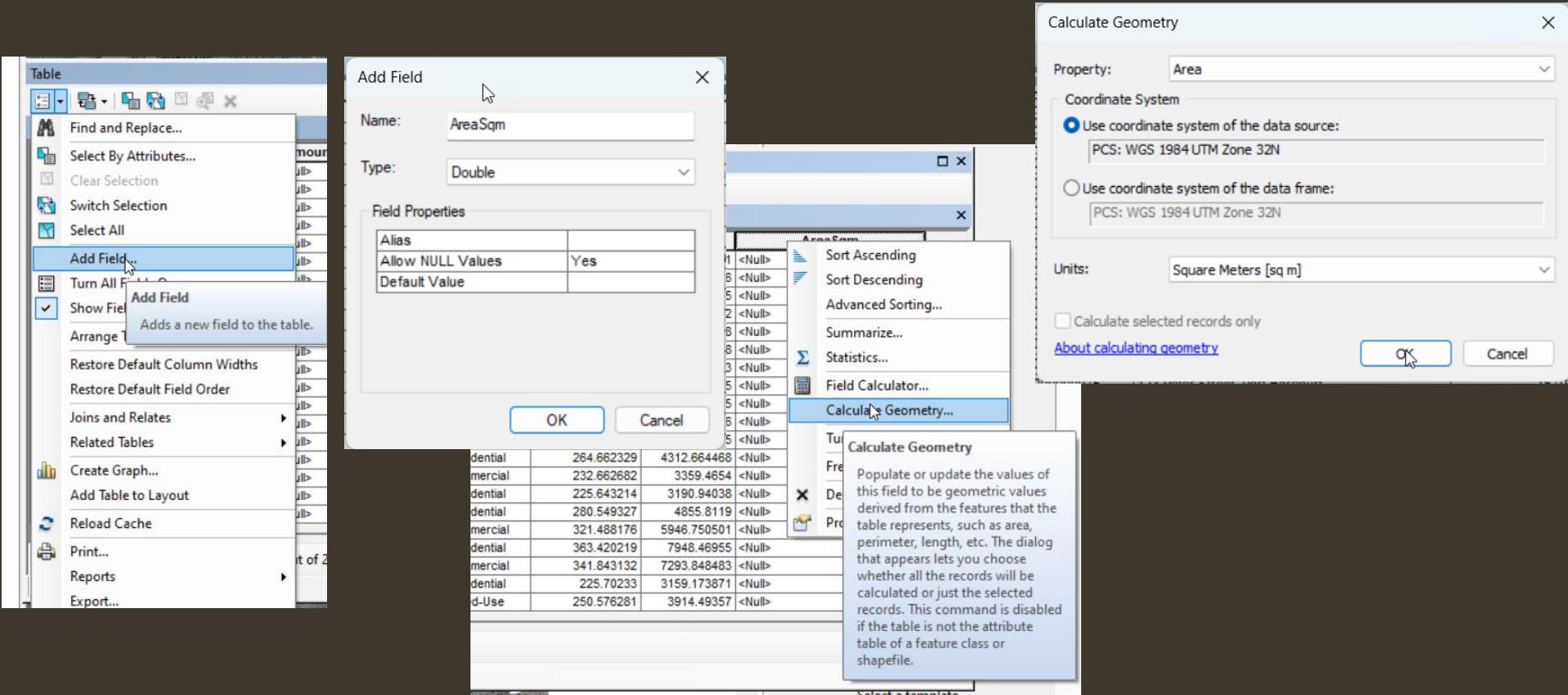
Parcel																
PlotNo	AmountCharged	No_Plots	SHAPE_Length	SHAPE_Area	SN	FirstName	LastName	Date_of_Purchase	Amount_Purchased	CompletedPayment	PaymentType	PhoneNumber	Sex	Address	Plot	
1</td> <td>239.33916</td> <td>3159.45501</td> <td>1</td> <td>Amma</td> <td>Yusuf</td> <td>6/12/2022</td> <td>500000.00</td> <td>YES</td> <td>Full Payment</td> <td>235000000000</td> <td>F</td> <td>123 Abuja Street, Port Harcourt</td> <td></td> <td></td>	239.33916	3159.45501	1	Amma	Yusuf	6/12/2022	500000.00	YES	Full Payment	235000000000	F	123 Abuja Street, Port Harcourt				
2</td> <td>219.447936</td> <td>2872.8626</td> <td>2</td> <td>Ibrahim</td> <td>Lawal</td> <td>3/18/2023</td> <td>850000.00</td> <td>YES</td> <td>Full Payment</td> <td>235000000000</td> <td>M</td> <td>456 ABC Road, Port Harcourt</td> <td></td> <td></td>	219.447936	2872.8626	2	Ibrahim	Lawal	3/18/2023	850000.00	YES	Full Payment	235000000000	M	456 ABC Road, Port Harcourt				
3</td> <td>237.029475</td> <td>3268.31075</td> <td>3</td> <td>Ngozi</td> <td>Eze</td> <td>9/5/2021</td> <td>1200000.00</td> <td>YES</td> <td>Full Payment</td> <td>235000000000</td> <td>F</td> <td>789 BUA Avenue, Port Harcourt</td> <td></td> <td></td>	237.029475	3268.31075	3	Ngozi	Eze	9/5/2021	1200000.00	YES	Full Payment	235000000000	F	789 BUA Avenue, Port Harcourt				
4</td> <td>196.440731</td> <td>2373.3862</td> <td>4</td> <td>Chinedu</td> <td>Okonkwo</td> <td>1/30/2023</td> <td>620000.00</td> <td>YES</td> <td>Full Payment</td> <td>235000000000</td> <td>M</td> <td>321 LNG Close, Port Harcourt</td> <td></td> <td></td>	196.440731	2373.3862	4	Chinedu	Okonkwo	1/30/2023	620000.00	YES	Full Payment	235000000000	M	321 LNG Close, Port Harcourt				
5</td> <td>202.444653</td> <td>2487.054098</td> <td>5</td> <td>Fatima</td> <td>Abdullahi</td> <td>11/22/2022</td> <td>430000.00</td> <td>YES</td> <td>Full Payment</td> <td>235000000000</td> <td>F</td> <td>654 Cocaine Lane, Port Harcourt</td> <td></td> <td></td>	202.444653	2487.054098	5	Fatima	Abdullahi	11/22/2022	430000.00	YES	Full Payment	235000000000	F	654 Cocaine Lane, Port Harcourt				
6</td> <td>234.408457</td> <td>3169.6758</td> <td>6</td> <td>Abdul</td> <td>Bello</td> <td>4/19/2023</td> <td>780000.00</td> <td>NO</td> <td>Installment</td> <td>235000000000</td> <td>F</td> <td>987 Beauty Street, Port Harcourt</td> <td></td> <td></td>	234.408457	3169.6758	6	Abdul	Bello	4/19/2023	780000.00	NO	Installment	235000000000	F	987 Beauty Street, Port Harcourt				
7</td> <td>208.440731</td> <td>2808.75008</td> <td>7</td> <td>Abdulkareem</td> <td>Kwasi</td> <td>7/10/2022</td> <td>350000.00</td> <td>NO</td> <td>Installment</td> <td>235000000000</td> <td>F</td> <td>234 RST Road, Port Harcourt</td> <td></td> <td></td>	208.440731	2808.75008	7	Abdulkareem	Kwasi	7/10/2022	350000.00	NO	Installment	235000000000	F	234 RST Road, Port Harcourt				
8</td> <td>185.672263</td> <td>2324.54045</td> <td>8</td> <td>Chukwudi</td> <td>Okafor</td> <td>12/8/2021</td> <td>960000.00</td> <td>NO</td> <td>Installment</td> <td>235000000000</td> <td>M</td> <td>234 RST Road, Port Harcourt</td> <td></td> <td></td>	185.672263	2324.54045	8	Chukwudi	Okafor	12/8/2021	960000.00	NO	Installment	235000000000	M	234 RST Road, Port Harcourt				
9</td> <td>208.375773</td> <td>2645.51045</td> <td>9</td> <td>Aisha</td> <td>Ibrahim</td> <td>2/14/2023</td> <td>680000.00</td> <td>NO</td> <td>Installment</td> <td>235000000000</td> <td>F</td> <td>587 Uniben Close, Port Harcourt</td> <td></td> <td></td>	208.375773	2645.51045	9	Aisha	Ibrahim	2/14/2023	680000.00	NO	Installment	235000000000	F	587 Uniben Close, Port Harcourt				
10</td> <td>215.599618</td> <td>2629.716</td> <td>10</td> <td>Yakubu</td> <td>Adamu</td> <td>10/3/2022</td> <td>470000.00</td> <td>NO</td> <td>Installment</td> <td>235000000000</td> <td>M</td> <td>432 Gorrie Street, Port Harcourt</td> <td></td> <td></td>	215.599618	2629.716	10	Yakubu	Adamu	10/3/2022	470000.00	NO	Installment	235000000000	M	432 Gorrie Street, Port Harcourt				
11</td> <td>338.777875</td> <td>6724.17685</td> <td>11</td> <td>Haleme</td> <td>Mohammed</td> <td>5/6/2023</td> <td>1050000.00</td> <td>YES</td> <td>Full Payment</td> <td>235000000000</td> <td>F</td> <td>876 Obi Road, Port Harcourt</td> <td></td> <td></td>	338.777875	6724.17685	11	Haleme	Mohammed	5/6/2023	1050000.00	YES	Full Payment	235000000000	F	876 Obi Road, Port Harcourt				
12</td> <td>264.686729</td> <td>4719.86445</td> <td>12</td> <td>Husa</td> <td>Sani</td> <td>8/20/2022</td> <td>720000.00</td> <td>YES</td> <td>Full Payment</td> <td>235000000000</td> <td>F</td> <td>367 Mark Close, Port Harcourt</td> <td></td> <td></td>	264.686729	4719.86445	12	Husa	Sani	8/20/2022	720000.00	YES	Full Payment	235000000000	F	367 Mark Close, Port Harcourt				
13</td> <td>208.440731</td> <td>2808.75008</td> <td>13</td> <td>Harriet</td> <td>Obasi</td> <td>11/10/2021</td> <td>580000.00</td> <td>YES</td> <td>Full Payment</td> <td>235000000000</td> <td>F</td> <td>987 Beauty Street, Port Harcourt</td> <td></td> <td></td>	208.440731	2808.75008	13	Harriet	Obasi	11/10/2021	580000.00	YES	Full Payment	235000000000	F	987 Beauty Street, Port Harcourt				
14</td> <td>225.643214</td> <td>3180.94038</td> <td>14</td> <td>Emeka</td> <td>Okeke</td> <td>3/5/2023</td> <td>320000.00</td> <td>YES</td> <td>Full Payment</td> <td>235000000000</td> <td>M</td> <td>901 Crown Street, Port Harcourt</td> <td></td> <td></td>	225.643214	3180.94038	14	Emeka	Okeke	3/5/2023	320000.00	YES	Full Payment	235000000000	M	901 Crown Street, Port Harcourt				
15</td> <td>280.594527</td> <td>4855.8119</td> <td>15</td> <td>Neke</td> <td>Okafor</td> <td>12/28/2022</td> <td>910000.00</td> <td>YES</td> <td>Full Payment</td> <td>235000000000</td> <td>F</td> <td>123 Peter Street, Port Harcourt</td> <td></td> <td></td>	280.594527	4855.8119	15	Neke	Okafor	12/28/2022	910000.00	YES	Full Payment	235000000000	F	123 Peter Street, Port Harcourt				
16</td> <td>321.488776</td> <td>5946.750501</td> <td>16</td> <td>Usman</td> <td>Alyu</td> <td>1/10/2023</td> <td>450000.00</td> <td>YES</td> <td>Full Payment</td> <td>235000000000</td> <td>M</td> <td>456 Johnson Road, Port Harcourt</td> <td></td> <td></td>	321.488776	5946.750501	16	Usman	Alyu	1/10/2023	450000.00	YES	Full Payment	235000000000	M	456 Johnson Road, Port Harcourt				
17</td> <td>363.420219</td> <td>7948.46955</td> <td>17</td> <td>Bola</td> <td>Adeleke</td> <td>9/13/2022</td> <td>650000.00</td> <td>NO</td> <td>Installment</td> <td>235000000000</td> <td>F</td> <td>123 New market Street, Port Harcourt</td> <td></td> <td></td>	363.420219	7948.46955	17	Bola	Adeleke	9/13/2022	650000.00	NO	Installment	235000000000	F	123 New market Street, Port Harcourt				
18</td> <td>341.843132</td> <td>7293.848483</td> <td>18</td> <td>Abdulrahman</td> <td>Dauda</td> <td>10/24/2021</td> <td>820000.00</td> <td>NO</td> <td>Installment</td> <td>235000000000</td> <td>M</td> <td>456 Refinery Road, Port Harcourt</td> <td></td> <td></td>	341.843132	7293.848483	18	Abdulrahman	Dauda	10/24/2021	820000.00	NO	Installment	235000000000	M	456 Refinery Road, Port Harcourt				
19</td> <td>225.70233</td> <td>3159.173871</td> <td>19</td> <td>Nekechi</td> <td>Obi</td> <td>4/16/2023</td> <td>390000.00</td> <td>YES</td> <td>Full Payment</td> <td>235000000000</td> <td>F</td> <td>789 Hospital Avenue, Port Harcourt</td> <td></td> <td></td>	225.70233	3159.173871	19	Nekechi	Obi	4/16/2023	390000.00	YES	Full Payment	235000000000	F	789 Hospital Avenue, Port Harcourt				
20</td> <td>258.576281</td> <td>3914.49357</td> <td>20</td> <td>Idris</td> <td>Ibrahim</td> <td>7/1/2022</td> <td>110000.00</td> <td>YES</td> <td>Full Payment</td> <td>235000000000</td> <td>M</td> <td>654 Gift Lane, Port Harcourt</td> <td></td> <td></td>	258.576281	3914.49357	20	Idris	Ibrahim	7/1/2022	110000.00	YES	Full Payment	235000000000	M	654 Gift Lane, Port Harcourt				

Data Analysis/Processing

Adding the “AreaSqm” Field



- Click the Table Option Icon in the ParcelUpdate Attribute Table
- Select Add Fields
- Fill the appropriate section as in the graphics and select ok
- Right Click on AreaSqm Field
- Select Calculate Geometry.
- In the Property Field Select Area in the drop Down and select Ok



Data Analysis/Processing

Changing the Decimal places of “AreaSqm” Field



- Right Click on **AreaSqm** Field
- Select **Properties**.
- Select **numeric**
- Change the Number of decimal places to **3**

The screenshot illustrates the workflow for modifying a field's properties in ArcGIS Pro:

- Left Panel:** Shows a table view titled "ParcelUpdate" with columns: PlotNumber, LandUse, SHAPE_Length, SHAPE_Area, and AreaSqm.
- Middle Panel:** A context menu is open over the "AreaSqm" column header, with the "Properties" option highlighted.
- Right Panel:** The "Field Properties" dialog box is open, showing the following details:
 - Name: AreaSqm
 - Alias: AreaSqm
 - Type: Double
 - Display:
 - Turn field off
 - Make field read only
 - Highlight field
 - Number Format: Numeric (highlighted)
 - Data:
 - Allow NULL Values: Yes
 - Default Value: (empty)
- Bottom Center:** The "Number Format" dialog box is open, showing the following settings:
 - Category: Numeric (highlighted)
 - Rounding:
 - Number of decimal places: 3 (selected)
 - Number of significant digits: (radio button)
 - Alignment:
 - Left (radio button)
 - Right (selected): 12 characters
 - General options for the display of numbers:
 - Show thousands separators: (checkbox)
 - Pad with zeros: (checkbox)
 - Show plus sign: (checkbox)

Data Analysis/Processing

Calculating the Total Number of plots



- Right Click on the **No_Plots** Field
- Select **Field calculator**.
- In the **Field calculator** dialog box type [AreaSqm] /465
- *NB. 465 is the Approximate Area for one plot of land in Rivers State*

Table
ParcelUpdate

OBJECTID *	SHAPE *	PlotNo	AmountCharged	No_Plots	SN	FirstName	LastName	Date_of_Purchase	Am
1	Polygon	1	<Null>	<Null>				2/2022	
2	Polygon	2	<Null>	<Null>				8/2023	
3	Polygon	3	<Null>	<Null>				8/2021	
4	Polygon	4	<Null>	<Null>				8/2023	
5	Polygon	5	<Null>	<Null>				22/2022	
6	Polygon	6	<Null>	<Null>				8/2023	
7	Polygon	7	<Null>	<Null>				7/2022	
8	Polygon	8	<Null>	<Null>				8/2021	
9	Polygon	9	<Null>	<Null>				4/2023	
10	Polygon	10	<Null>	<Null>					
11	Polygon	11	<Null>	<Null>					
12	Polygon	12	<Null>	<Null>					
13	Polygon	13	<Null>	<Null>					
14	Polygon	14	<Null>	<Null>					
15	Polygon	15	<Null>	<Null>					
16	Polygon	16	<Null>	<Null>					
17	Polygon	17	<Null>	<Null>					
18	Polygon	18	<Null>	<Null>					
19	Polygon	19	<Null>	<Null>					
20	Polygon	20	<Null>	<Null>					

Field Calculator...
Calculate Geometry...
Turn Field Off...
Freeze/Unfreeze...
Delete Field...
Properties...

Field Calculator
Populate or update the values of this field by specifying a calculation expression. If any of the records in the table are currently selected, only the values of the selected records will be calculated.

Table
ParcelUpdate

OBJECTID *	SHAPE *	PlotNo	AmountCharged	No_Plots	SN	FirstName	LastName	Date_of_Purchase	Am
1	Polygon	1	<Null>	6.794527	1 A				
2	Polygon	2	<Null>	6.178199	2 Ib				
3	Polygon	3	<Null>	7.024324	3 N				
4	Polygon	4	<Null>	5.105239	4 C				
5	Polygon	5	<Null>	5.348503	5 Fa				
6	Polygon	6	<Null>	6.816507	6 Ap				
7	Polygon	7	<Null>	6.169654	7 Fu				
8	Polygon	8	<Null>	5.007614	8 Ch				
9	Polygon	9	<Null>	5.68927	9 A				
10	Polygon	10	<Null>	6.085411	10 Y				
11	Polygon	11	<Null>	14.4606	11 Ha				
12	Polygon	12	<Null>	9.274547	12 M				
13	Polygon	13	<Null>	7.224657	13 A				
14	Polygon	14	<Null>	6.862237	14 Er				
15	Polygon	15	<Null>	10.442606	15 N				
16	Polygon	16	<Null>	12.788711	16 Us				
17	Polygon	17	<Null>	17.093483	17 Ba				
18	Polygon	18	<Null>	15.685696	18 Al				
19	Polygon	19	<Null>	6.793922	19 N				
20	Polygon	20	<Null>	8.418266	20 Id				

Field Calculator
Parser: VB Script
Fields: PaymentType, PhoneNumber, Sex, Address, PlotNumber, LandUse, SHAPE_Length, SHAPE_Area, AreaSqm
Type: Number
Functions: Abs(), Atan(), Cos(), Exp(), Fix(), Int(), Log(), Sin(), Sqr(), Tan()
Show Codeblock
No_Plots = [AreaSqm] /465
About calculating fields
Clear Load... Save... OK Cancel

Data Analysis/Processing

Calculating the Amount charged for each parcel



- Right Click on the **AmountCharged** Field
- Select Field calculator.
- In the Field calculator dialog box type [No_Plots]*195000
- *NB. 195000 is the amount to be charged for layouts up to 20 plots, in the revised Rivers State's scale of fees.*

Table ParcelUpdate

OBJECTID *	SHAPE *	PlotNo	AmountCharged	No_Plots	SN	FirstName	LastName	Date_of_Purchase
1	Polygon	1	<Null>	6.794527	1	Amina	Yusuf	6/12/2022
2	Polygon	2	<Null>	6.178199	2	Ibrahim	Lawal	3/18/2023
3	Polygon	3	<Null>	7.024324	3	Ngozi	Eze	9/5/2021
4	Polygon	4	<Null>	5.105239	4	Chinedu	Oko	1/30/2023
5	Polygon	5	<Null>	5.348503	5	Fatima	Abdullahi	11/22/2022
6	Polygon	6	<Null>	6.816507	6	Abdul	Bello	4/10/2023
7	Polygon	7	<Null>	6.169654	7	Funke	Ade	12/8/2021
8	Polygon	8	<Null>	5.007614	8	Chukwudi	Okafor	7/17/2022
9	Polygon	9	<Null>	5.68927	9	Aisha	Ibrahim	2/14/2022
10	Polygon	10	<Null>	6.085411	10	Yakubu	Ada	17.093483
11	Polygon	11	<Null>	14.4606	11	Halima	Mohammed	15.685696
12	Polygon	12	<Null>	9.274547	12	Musa	Sanusi	18.793922
13	Polygon	13	<Null>	7.224657	13	Ada	Nwankwo	19.418266
14	Polygon	14	<Null>	6.862237	14	Emeka	Okechukwu	20.093483
15	Polygon	15	<Null>	10.442606	15	Nneka	Okafor	13.38136.288392
16	Polygon	16	<Null>	12.788711	16	Usman	Aliyu	20.36308.216143
17	Polygon	17	<Null>	17.093483	17	Bola	Ade	24.93798.597181
18	Polygon	18	<Null>	15.685696	18	Abdulrahman	Dau	33.33229.166151
19	Polygon	19	<Null>	6.793922	19	Nkechi	Obi	30.58710.654354
20	Polygon	20	<Null>	8.418266	20	Idris	Ibrahim	13.24814.848992

(0 out of 20 Selected)

ParcelUpdate

Field Calculator

Parser: VB Script Python

Type: Number String Date

Fields: OBJECTID, SHAPE, PlotNo, AmountCharged, No_Plots, SN, FirstName, LastName, Date_of_Purchase

Functions:

- Abs()
 - Atn()
 - Cos()
 - Exp()
 - Fix()
 - Int()
 - Log()
 - Sin()
 - Sqr()
 - Tan()

PlotNo AmountCharged No_Plots SN FirstName LastName Date_of_Purchase

AmountCharged = [No_Plots]*195000

About calculating fields Clear Load... OK

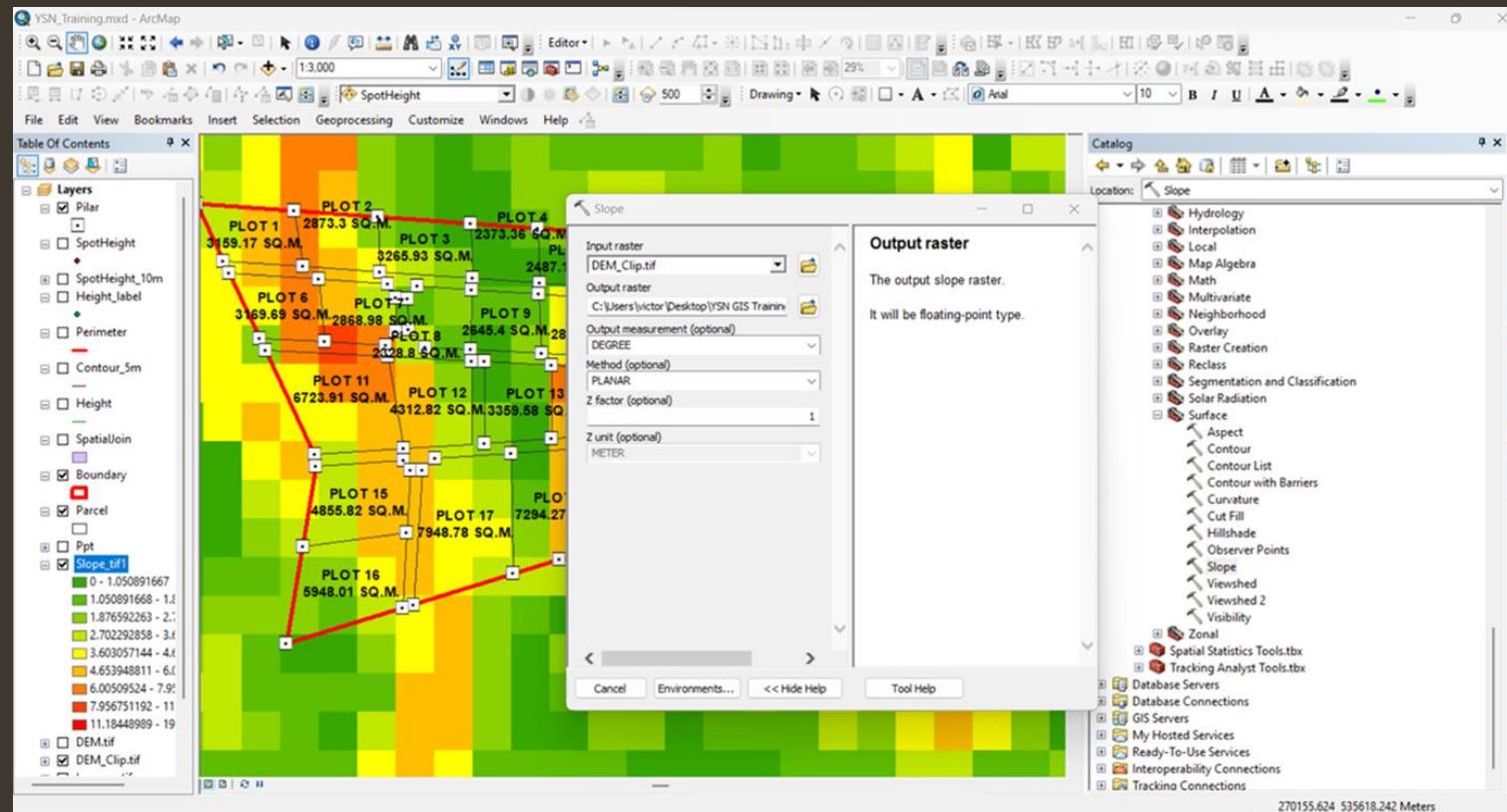
(0 out of 20 Selected)

Data Analysis/Processing

Estimating area Susceptible to flood based on Slope



- Click on **Toolbox** icon
- Select the **Analysis Tool**
- Scroll to **Surface** and select **Slope**.
- Select the necessary inputs



Data Analysis/Processing

Estimating area Susceptible to flood based on Slope



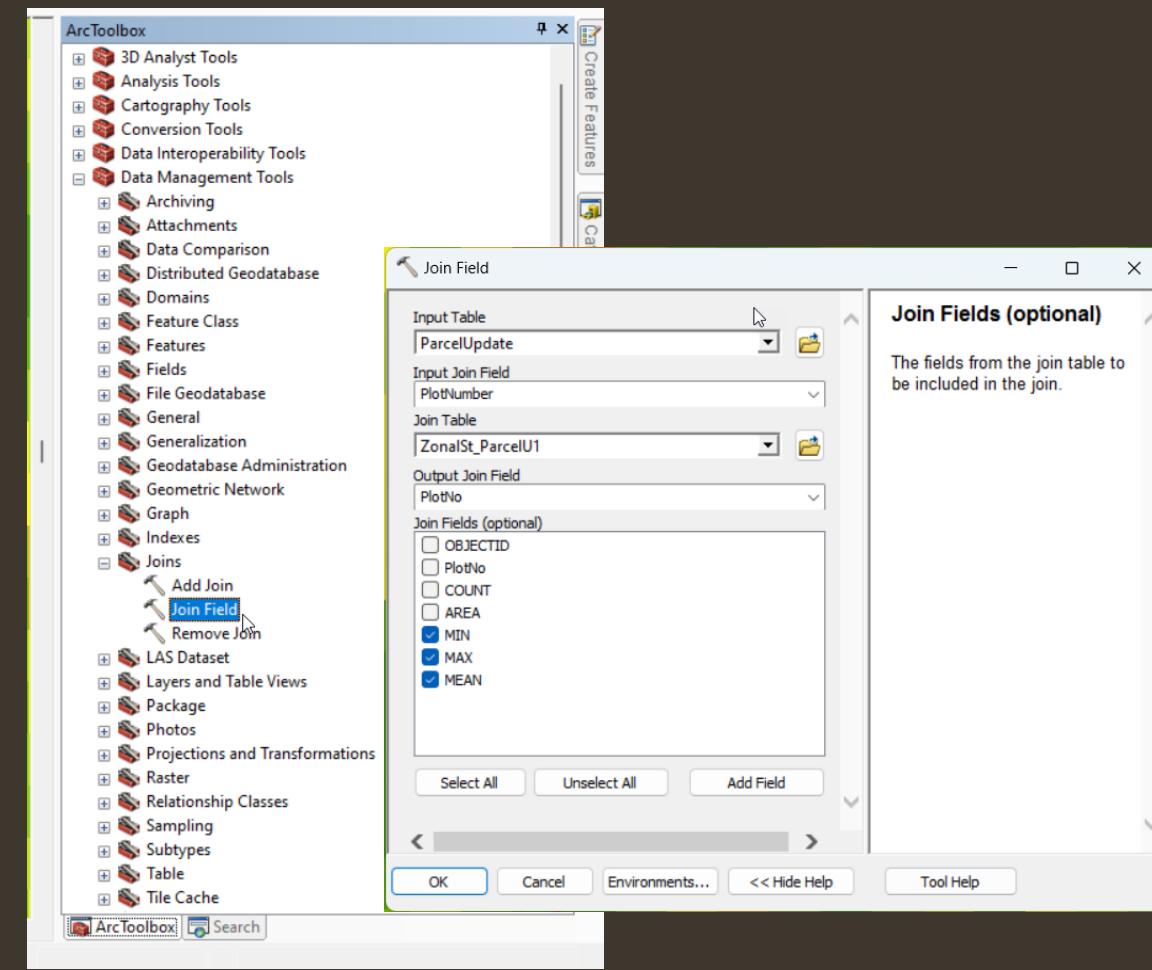
- Click on Toolbox icon
- Select the Spatial Analyst Tools
- Scroll to Zonal and select Zonal Statistics as Table.
- Select the necessary inputs
- You can check the attribute Table of the Zonal Statistics as Table “ZonalSt_ParcelU1” created

The screenshot illustrates the ArcGIS interface for performing a Zonal Statistics analysis. The ArcToolbox window on the left shows the Spatial Analyst Tools category selected. The Table Of Contents window in the center displays a raster layer named 'Slope.tif' and several vector layers including 'PilarPoint', 'Pillar', 'Perimeter', 'ParcelLine', 'Road', 'ParcelUpdate', 'Parcel', and 'PlotNo'. A context menu is open over the 'ZonalSt_ParcelU1' table, with the 'Open' option highlighted. The 'Table' window on the right shows the resulting 'ZonalSt_ParcelU1' table with 20 rows of data. The table includes columns for OBJECTID*, PlotNo, COUNT, AREA, MIN, MAX, and MEAN. The data shows various plot numbers and their corresponding statistics based on the slope raster.

| OBJECTID* | PlotNo | COUNT | AREA | MIN | MAX | MEAN |
|-----------|--------|-------|-------------|----------|----------|----------|
| 1 | 1 | 2 | 1915.653248 | 3.096769 | 4.824617 | 3.960693 |
| 2 | 2 | 5 | 4789.13312 | 2.086089 | 7.596378 | 4.548172 |
| 3 | 3 | 4 | 3831.306496 | 0.754259 | 2.748703 | 1.637507 |
| 4 | 4 | 4 | 3831.306496 | 0.311399 | 1.617772 | 0.832172 |
| 5 | 5 | 2 | 1915.653248 | 0.803284 | 5.794181 | 3.298732 |
| 6 | 6 | 2 | 1915.653248 | 4.36789 | 7.514503 | 5.941196 |
| 7 | 7 | 2 | 1915.653248 | 2.843368 | 5.75894 | 4.301154 |
| 8 | 8 | 3 | 2873.479872 | 1.191724 | 2.135438 | 1.639321 |
| 9 | 9 | 4 | 3831.306496 | 0.92767 | 2.259556 | 1.400922 |
| 10 | 10 | 4 | 3831.306496 | 3.654302 | 6.145612 | 4.62205 |
| 11 | 11 | 6 | 5746.959744 | 3.897346 | 7.387617 | 5.278129 |
| 12 | 12 | 4 | 3831.306496 | 2.039515 | 4.978742 | 3.744985 |
| 13 | 13 | 4 | 3831.306496 | 0.739532 | 1.944512 | 1.322848 |
| 14 | 14 | 4 | 3831.306496 | 5.152882 | 6.143383 | 5.543435 |
| 15 | 15 | 3 | 2873.479872 | 2.953219 | 4.727005 | 3.646196 |
| 16 | 16 | 7 | 6704.786369 | 1.588645 | 4.917073 | 2.92074 |
| 17 | 17 | 8 | 7662.612993 | 2.592185 | 4.481014 | 3.564416 |
| 18 | 18 | 9 | 8620.439617 | 0.926381 | 5.77633 | 4.13787 |
| 19 | 19 | 4 | 3831.306496 | 2.94 | 3.885984 | 3.281832 |
| 20 | 20 | 4 | 3831.306496 | 1.25521 | 2.535203 | 2.023619 |

Data Analysis/Processing

Attaching the “Min, Max & Mean” Slope to the parcel



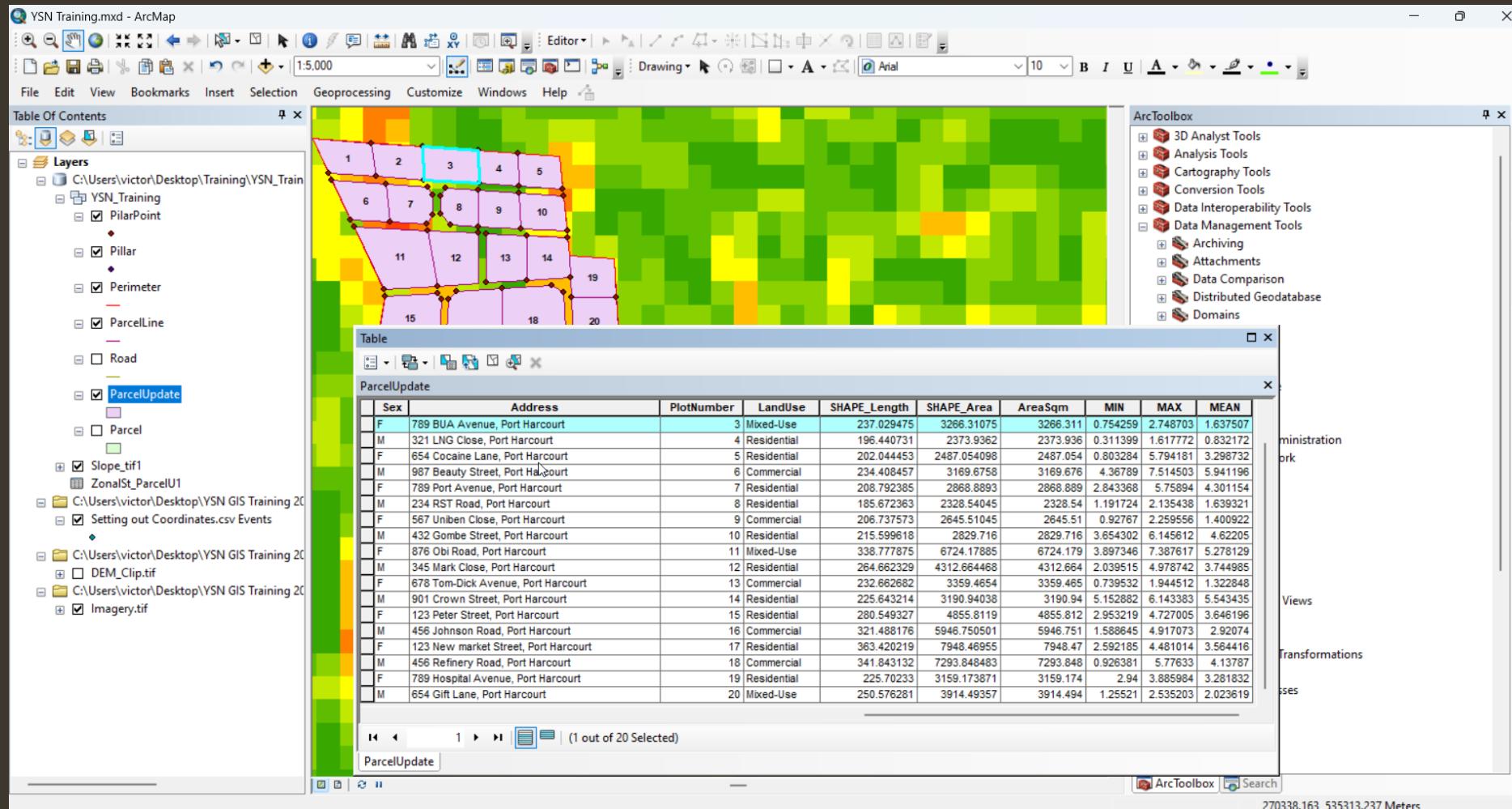
- Click on **Toolbox** icon
- Select the **Data Management Tools**
- Scroll to **Joins** and select **Join field**
- **Select the necessary inputs as shown in the graphics.**

Data Analysis/Processing

View Min, Max & Mean" Slope Added to the Updatedparcel

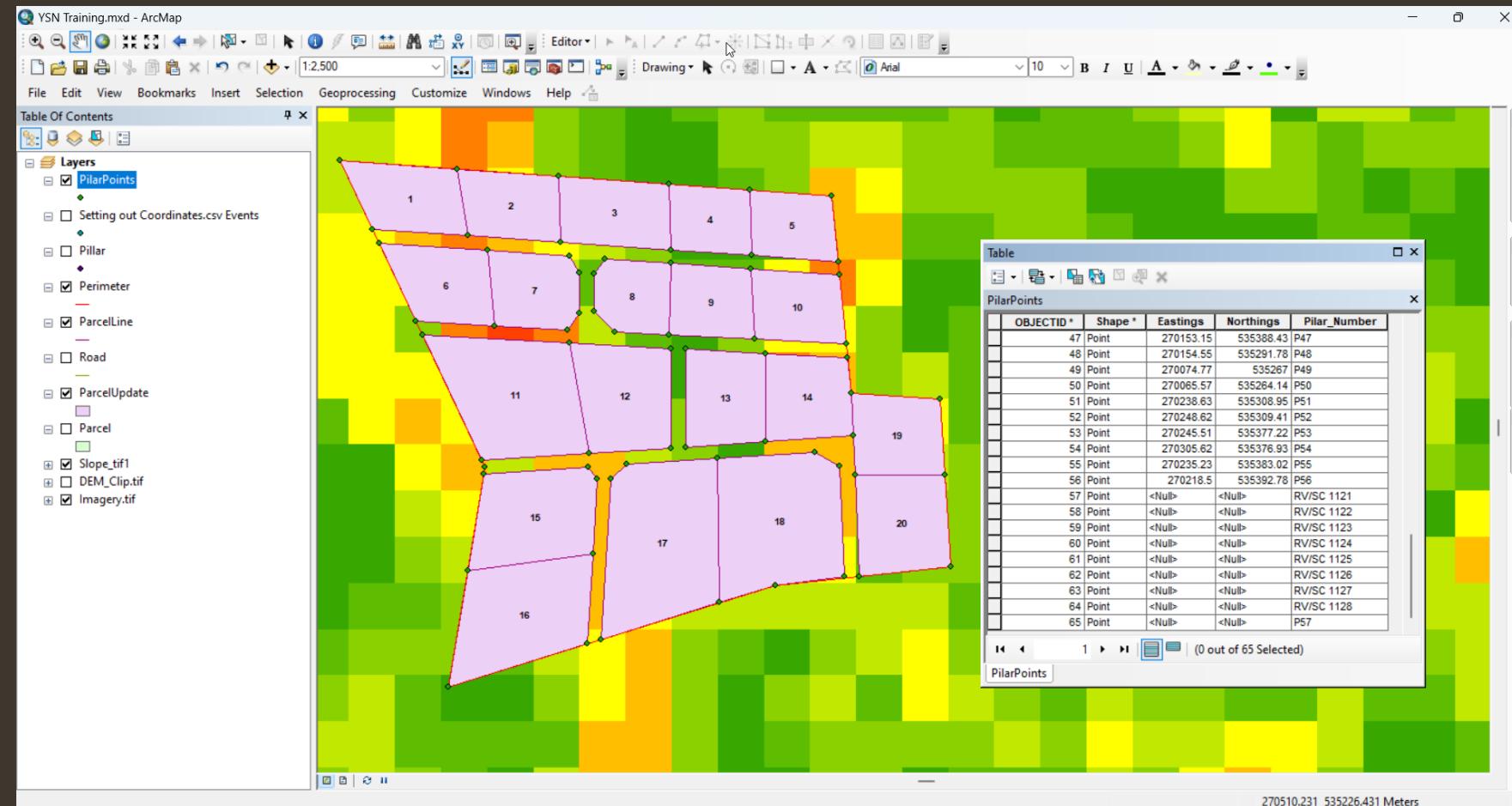


- Right Click on ParcelUpdate
- Select Open Attribute Table.



Data Analysis/Processing

Number of Pillars Issued to Each Client



NB. Ensure you have added the entire Pillars for the Project.

- Click on Toolbox icon
- Select the Spatial Analyst Tools
- Scroll to Zonal and select Zonal Statistics as Table.
- Select the necessary inputs
- You can check the attribute Table of the Zonal Statistics as Table “**ZonalSt_ParcelU1**” created

Data Analysis/Processing

Number of Pillars Issued to Each Client



The screenshot shows the ArcToolbox interface with the 'Tabulate Intersection' tool selected. The 'Input Zone Features' dropdown is set to 'ParcelUpdate'. Under 'Sum Fields (optional)', the 'PlotNumber' field is listed. The 'Input Class Features' dropdown is also set to 'ParcelUpdate'. The 'Output Table' is specified as 'C:\Users\Victor\Desktop\Training\YSN_Training.gdb\Pilar'. A 'Table' window is open, displaying a dataset named 'PilarPoints_TabulateIntersec' with 20 rows. The columns are 'OBJECTID*', 'PlotNumber', 'AREA', and 'PERCENTAGE'. The data shows various plot numbers and their areas, with all percentages being 100.

| OBJECTID* | PlotNumber | AREA | PERCENTAGE |
|-----------|------------|-------------|------------|
| 2 | 2 | 2872.8626 | 100 |
| 3 | 3 | 3266.31075 | 100 |
| 4 | 4 | 2373.9362 | 100 |
| 5 | 5 | 2487.054097 | 100 |
| 6 | 6 | 3169.6758 | 100 |
| 7 | 7 | 2868.8893 | 100 |
| 8 | 8 | 2328.54045 | 100 |
| 9 | 9 | 2645.51045 | 100 |
| 10 | 10 | 2829.716 | 100 |
| 11 | 11 | 6724.17885 | 100 |
| 12 | 12 | 4312.664468 | 100 |
| 13 | 13 | 3359.4654 | 100 |
| 14 | 14 | 3190.94038 | 100 |
| 15 | 15 | 4855.8119 | 100 |
| 16 | 16 | 5946.750501 | 100 |
| 17 | 17 | 7948.46955 | 100 |
| 18 | 18 | 7293.848483 | 100 |
| 19 | 19 | 3159.173871 | 100 |
| 20 | 20 | 3914.49357 | 100 |

- Click on **Toolbox** icon
- Select the **Analysis Tools**
- Scroll to **Statistics** and select **Tabulate intersection**.
- Select the necessary inputs

Data Analysis/Processing

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The screenshot shows the ArcGIS Pro interface with the ArcToolbox open on the left. A specific tool, 'Tabulate Intersection', is selected under the 'Statistics' category. The main workspace displays two dialog boxes: 'Tabulate Intersection' and 'Table'. The 'Tabulate Intersection' dialog shows inputs for 'Input Zone Features' (ParcelUpdate), 'Zone Fields' (PlotNo), 'Input Class Features' (PilarPoints), and 'Output Table' (C:\Users\Victor\Desktop\Training\YSN_Training.gdb\ParcelUpdate_TabulateIntersection). The 'Table' dialog shows a data table titled 'ParcelUpdate_TabulateIntersection1' with four columns: OBJECTID*, PlotNo, PNT_COUNT, and PERCENTAGE. The data is as follows:

| OBJECTID* | PlotNo | PNT_COUNT | PERCENTAGE |
|-----------|--------|-----------|------------|
| 1 | 1 | 4 | 6.153846 |
| 2 | 2 | 4 | 6.153846 |
| 3 | 3 | 4 | 6.153846 |
| 4 | 4 | 4 | 6.153846 |
| 5 | 5 | 4 | 6.153846 |
| 6 | 6 | 4 | 6.153846 |
| 7 | 7 | 6 | 9.230769 |
| 8 | 8 | 6 | 9.230769 |
| 9 | 9 | 4 | 6.153846 |
| 10 | 10 | 4 | 6.153846 |
| 11 | 11 | 4 | 6.153846 |
| 12 | 12 | 4 | 6.153846 |
| 13 | 13 | 4 | 6.153846 |
| 14 | 14 | 5 | 7.692308 |
| 15 | 15 | 5 | 7.692308 |
| 16 | 16 | 4 | 6.153846 |
| 17 | 17 | 5 | 7.692308 |
| 18 | 18 | 6 | 9.230769 |
| 19 | 19 | 5 | 7.692308 |
| ... | ... | ... | ... |

- Click on **Toolbox** icon
- Select the **Analysis Tools**
- Scroll to **Statistics** and select **Tabulate intersection**.
- Select the necessary inputs

Data Analysis/Processing

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- Click on Toolbox icon
- Select the Data Management Tools
- Scroll to **Joins** and select **Join field**
- Select the necessary inputs as shown in the graphics.

The screenshot shows the ArcMap interface with the following components:

- ArcToolbox:** On the left, under the "Data Management Tools" section, the "Joins" category is expanded, and the "Join Field" tool is selected.
- Table Of Contents:** Shows various layers including "PillarPoints", "Pillar", "Perimeter", "Parcelline", "Road", "ParcelUpdate", "Parcel", "Slope.tif1", "ZonalSt_ParcelU1", and "ParcelUpdate_TabulateInterse1".
- Join Field Dialog:** A modal window titled "Join Field" is open. It shows the "Input Table" as "ParcelUpdate", "Input Join Field" as "PlotNo", and "Join Table" as "ParcelUpdate_TabulateInterse1". Under "Join Fields (optional)", the "PNT_COUNT" field is checked. Buttons at the bottom include "OK", "Cancel", "Environments...", "Add Field", and "Tool Help".
- Table View:** A "Table" view window titled "ParcelUpdate" displays a table with 18 rows. The columns are: PlotNumber, LandUse, SHAPE_Length, SHAPE_Area, AreaSqm, MIN, MAX, MEAN, and PNT_COUNT. The data includes various plot types like Residential, Commercial, and Mixed-Use across different areas.

Data Analysis/Processing

Renaming some fields in ParcelUpdate



- Click on Arc Catalog icon
- Locate the “YSN_Training.gdb” Geodatabase
- Right click on “ParcelUpdated” Select Properties.
- In the Fields Tab, Double click on *MIN, MAX, MEAN & PNT_Count* Field and rename them to *Min_Slope, Max_Slope, Mean_Slope & No_Pillar_Issued*
- inputs as shown in the graphics.

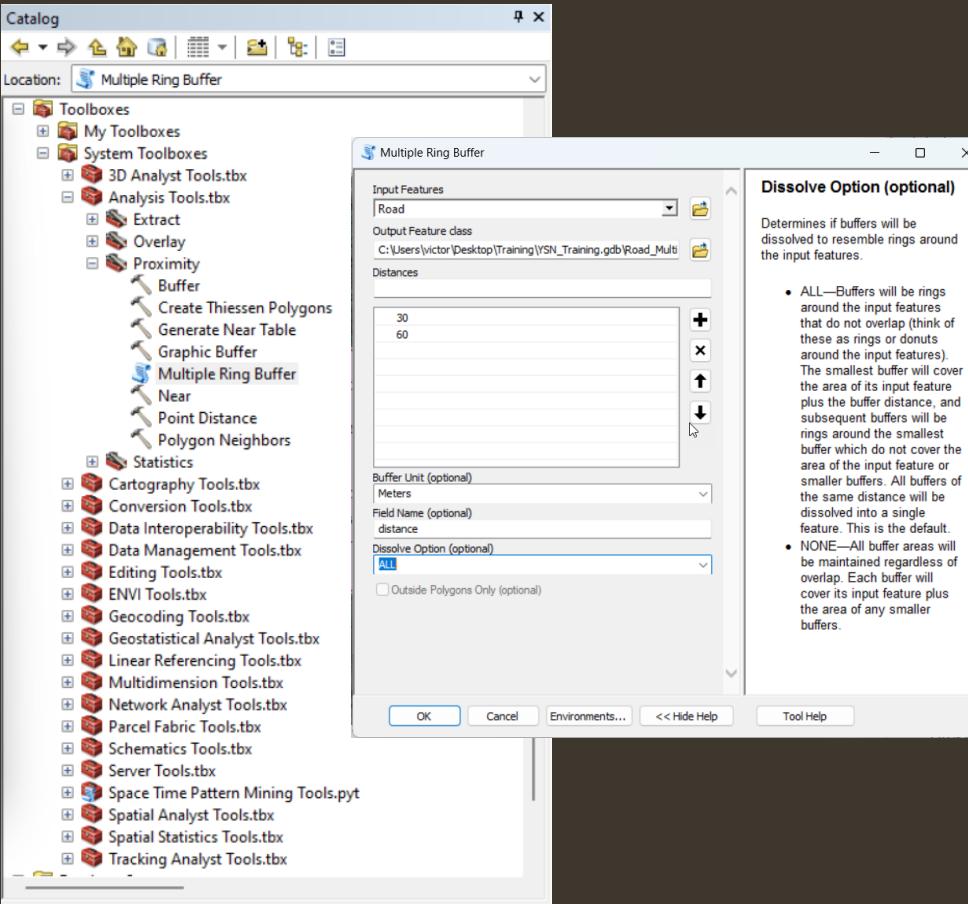
The screenshot illustrates the workflow for renaming fields in the **ParcelUpdate** feature class:

- ArcCatalog View:** Shows the **YSN_Training.gdb** geodatabase in the Catalog pane. The **ParcelUpdate** feature class is selected.
- Right-click Context Menu:** A context menu is open for the **ParcelUpdate** feature class, with the **Properties...** option highlighted.
- Feature Class Properties - Fields Tab:** The **Fields** tab is active, displaying the current field structure. The fields **MIN**, **MAX**, and **MEAN** are selected and highlighted with a red bracket.
- Renamed Fields:** The second screenshot shows the same **Fields** tab after renaming. The fields have been renamed to **Min_Slope**, **Max_Slope**, **Mean_Slope**, and **No_Pillar_Issued**.
- Table View:** Below the properties windows, a table view of the **ParcelUpdate** feature class is shown. It displays various spatial and attribute data for 20 records, including the newly renamed fields.

Data Analysis/Processing Buildings Impacted by Road Dualization



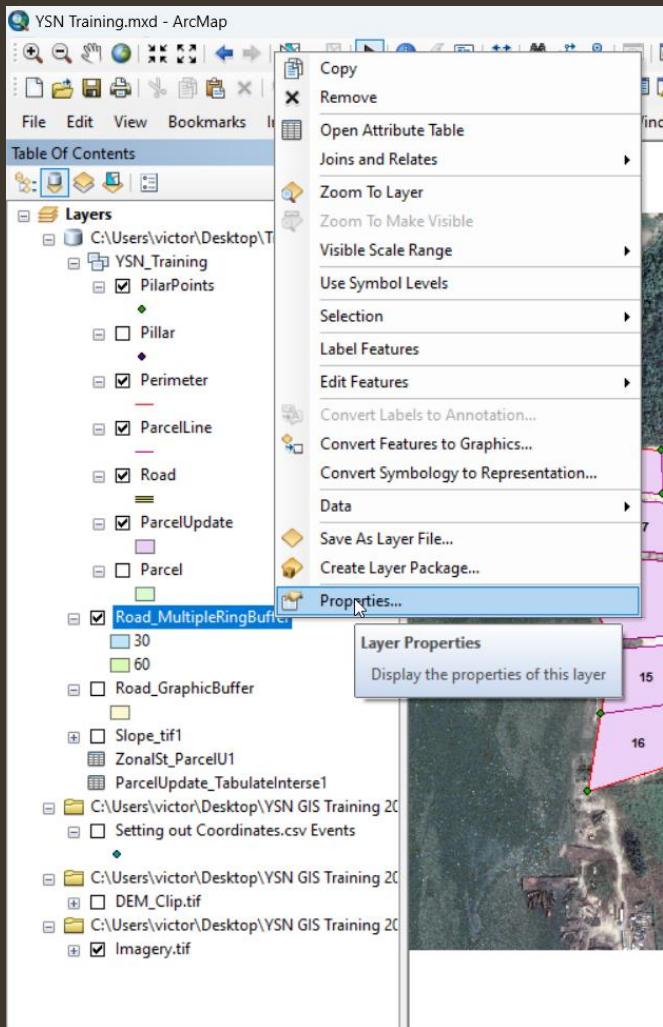
- Click on **Toolbox** icon
- Select the **Analysis Tools**
- Scroll to **Proximity** and select **Multiple Ring Buffer**
- **Select the necessary inputs as shown in the graphics.**



Data Analysis/Processing Buildings Impacted by Road Dualization

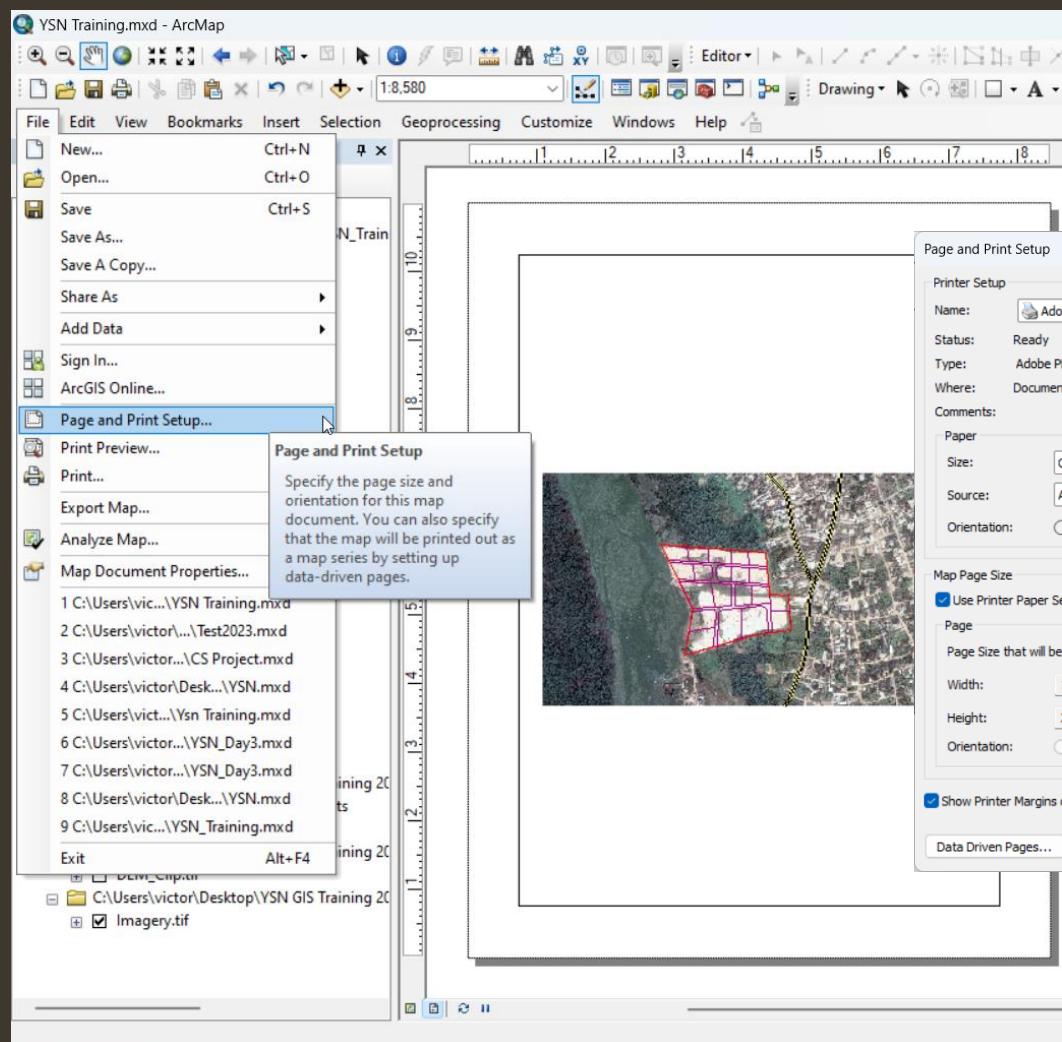


- Right Click on **Road_MultipleRingBuffer**
- Select the Properties
- Select Display Tab
- In the Transparent Section type 60



Data Visualization

Setting up your Print page



- Right Click on Road_MultipleRingBuffer Select the Properties
- Select Display Tab
- In the Transparent



Data Visualization

Setting up your Layout



- Adjust the layout to taste using the Select Element tool in the Draw Pane
- Use the rotate Tool to align the bearing Text

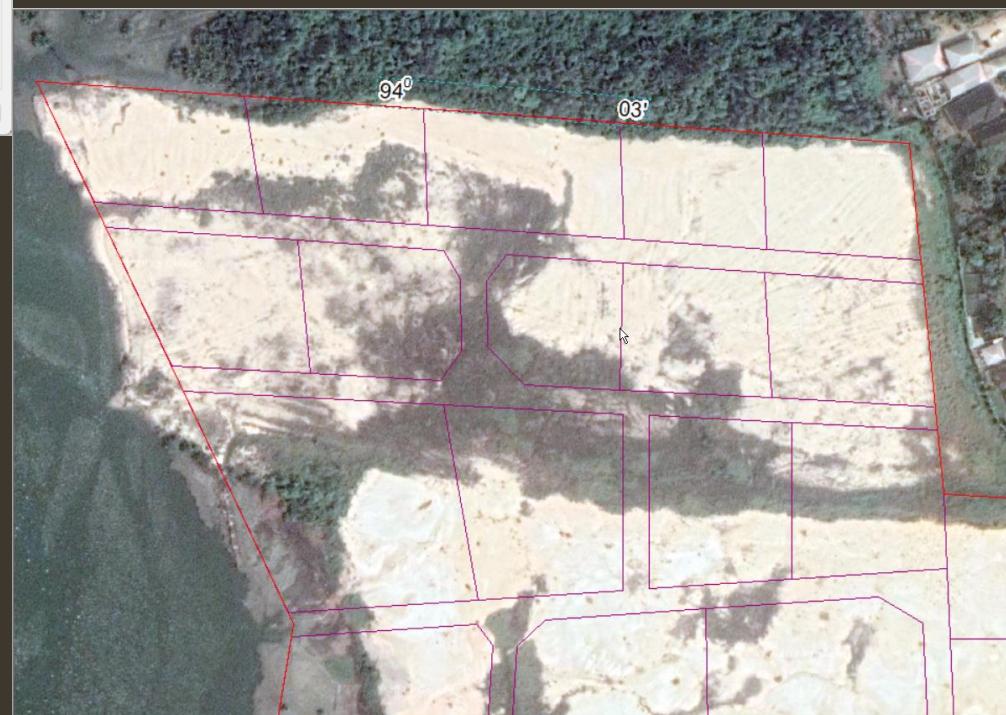
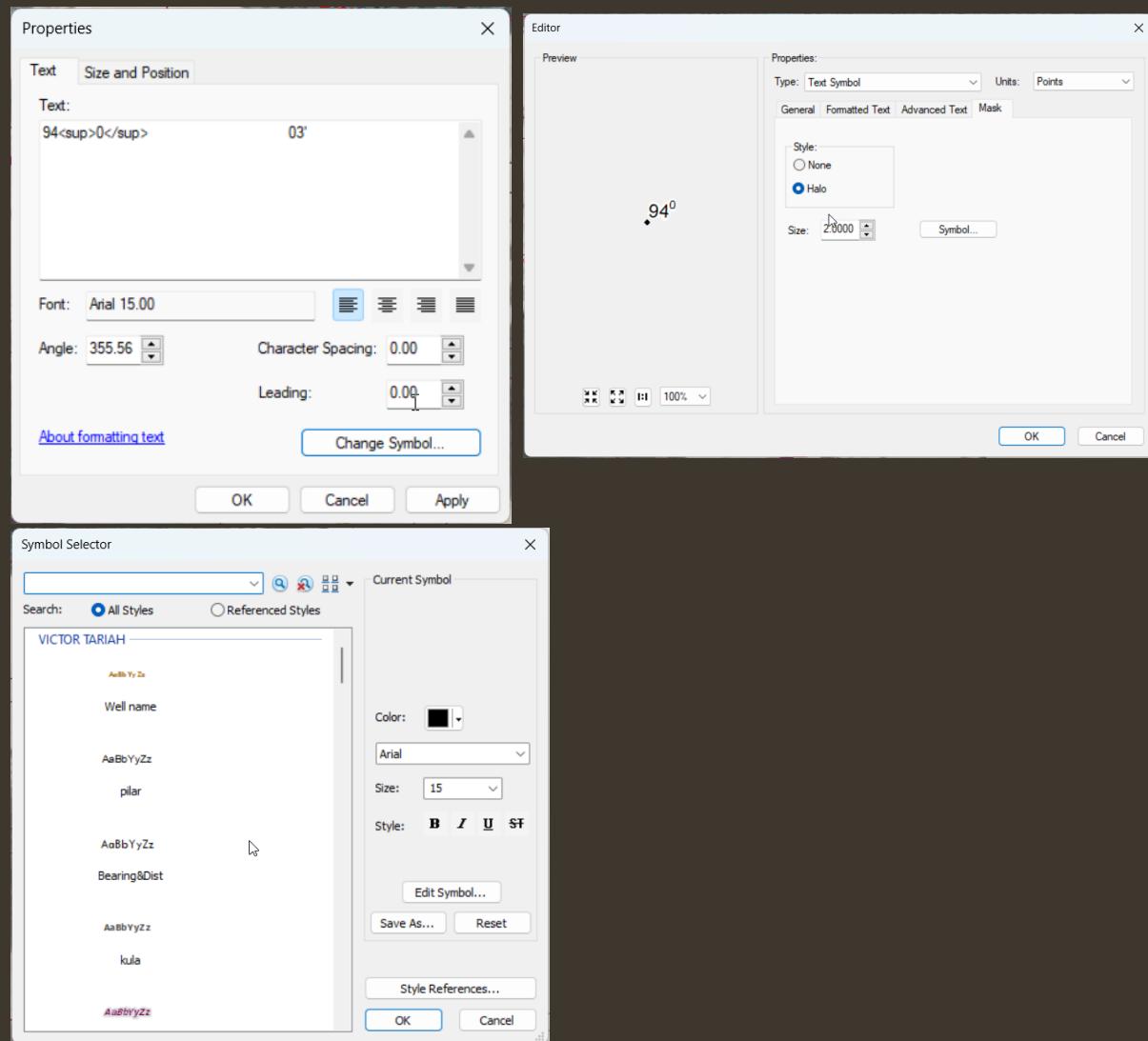
The image shows a screenshot of ArcGIS Pro. On the left, there is a satellite map view showing a large area of land with a red polygon drawn over it. The polygon is divided into several smaller sections by internal red lines. On the right, a 'Properties' dialog box is open, specifically for a text element. The dialog box has tabs for 'Text' and 'Size and Position'. Under 'Text', the value '94⁰' is displayed. Under 'Angle', the value '354.65' is shown. The background of the dialog box shows a portion of the map where the bearing text is placed. The ArcGIS Pro ribbon menu is visible at the top, showing 'Geoprocessing', 'Customize', 'Windows', and 'Help'.

Data Visualization

Writing your Bearing and Distances



- Adjust the layout to taste using the Select Element tool in the Draw Pane
- Use the rotate Tool to align the bearing Text



Data Visualization Exporting and symbolizing your Boundary Pillars



- Right click on the PillarPoint Select Open Attribute Table
- Select the boundary pillars
- Right click on the PillarPoint
- Select Data Export Data
- Save it properly
- Select add it to map extent

- Double click on the newly added pillars
- In the Symbol Selector Pane, scroll to **Square 3**
- **Change the colour to white**

The screenshot shows the ArcMap interface with the 'PilarPoints' layer selected in the Table of Contents. A context menu is open over one of the points, with 'Export Data...' highlighted. To the right, the 'Symbol Selector' dialog box is open, showing various geometric symbols. The 'Square 3' symbol is selected and its properties are displayed: Color is white, Size is 18.00, and Angle is 0.00.

| OBJECTID | Shape | Eastings | Northings | Pilar_Number |
|----------|--------|-----------|-----------|--------------|
| 47 | Point | 270153.15 | 535388.43 | P47 |
| 48 | Point | 270154.55 | 535291.78 | P48 |
| 49 | Point | 270074.77 | 535267.94 | P49 |
| 50 | Point | 270065.57 | 535264.14 | P50 |
| 51 | Point | 270238.63 | 535308.95 | P51 |
| 52 | Point | 270248.62 | 535309.41 | P52 |
| 53 | Point | 270245.51 | 535377.22 | P53 |
| 54 | Point | 270305.62 | 535376.93 | P54 |
| 55 | Point | 270235.23 | 535383.02 | P55 |
| 56 | Point | 270216.5 | 535392.78 | P56 |
| 57 | <Null> | <Null> | RVSC 1121 | |
| 58 | <Null> | <Null> | RVSC 1122 | |
| 59 | <Null> | <Null> | RVSC 1123 | |
| 60 | <Null> | <Null> | RVSC 1124 | |
| 61 | <Null> | <Null> | RVSC 1125 | |
| 62 | <Null> | <Null> | RVSC 1126 | |
| 63 | <Null> | <Null> | RVSC 1127 | |
| 64 | <Null> | <Null> | RVSC 1128 | |
| 65 | <Null> | <Null> | P57 | |

Data Visualization

Converting your Pillar labels to Annotation



- Right click on the **Boundary_Pillars** Select Label Features
- Adjust the Holo and text sizes appropriately.
- Right click on the **Boundary_Pillars** Select *Convert Labels to annotation*
- Tick *In the Map, All Features*
- *NB. Your Map Scale should be 1:1500*

The screenshot shows a satellite map of a riverbank area with several land parcels outlined in red. Labels like RV/SC 1121 through 1128 are placed along the boundaries. A context menu is open over one of the labels, showing options like Copy, Remove, Open Attribute Table, and Convert Labels to Annotation... . The ArcMap interface includes a Table of Contents and a 'Convert Labels to Annotation' dialog box. The dialog box has 'Reference Scale' set to 1:1500, 'Create Annotation For' set to 'All features', and a table mapping 'Feature Layer' to 'Annotation Group'. The table shows:

| Feature Layer | Annotation Group |
|-----------------|----------------------|
| Boundary_Pillar | Boundary_Pillar Anno |

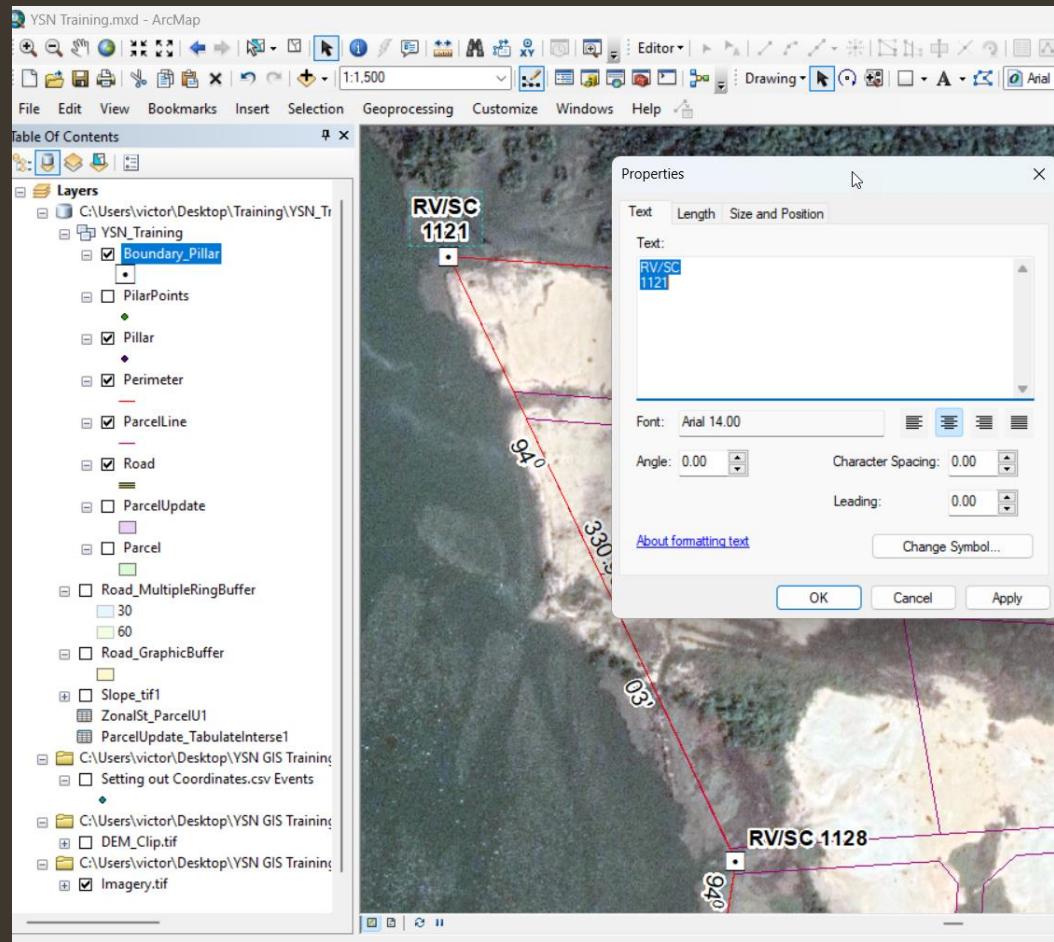
At the bottom of the dialog, there is a checkbox for 'Convert unplaced labels to unplaced annotation' and buttons for 'Convert' and 'Cancel'.

Data Visualization

Converting your Pillar labels to Annotation



- You can adjust/align the various Boundary pillar points to taste
- *NB. Your Map Scale should be 1:1500*

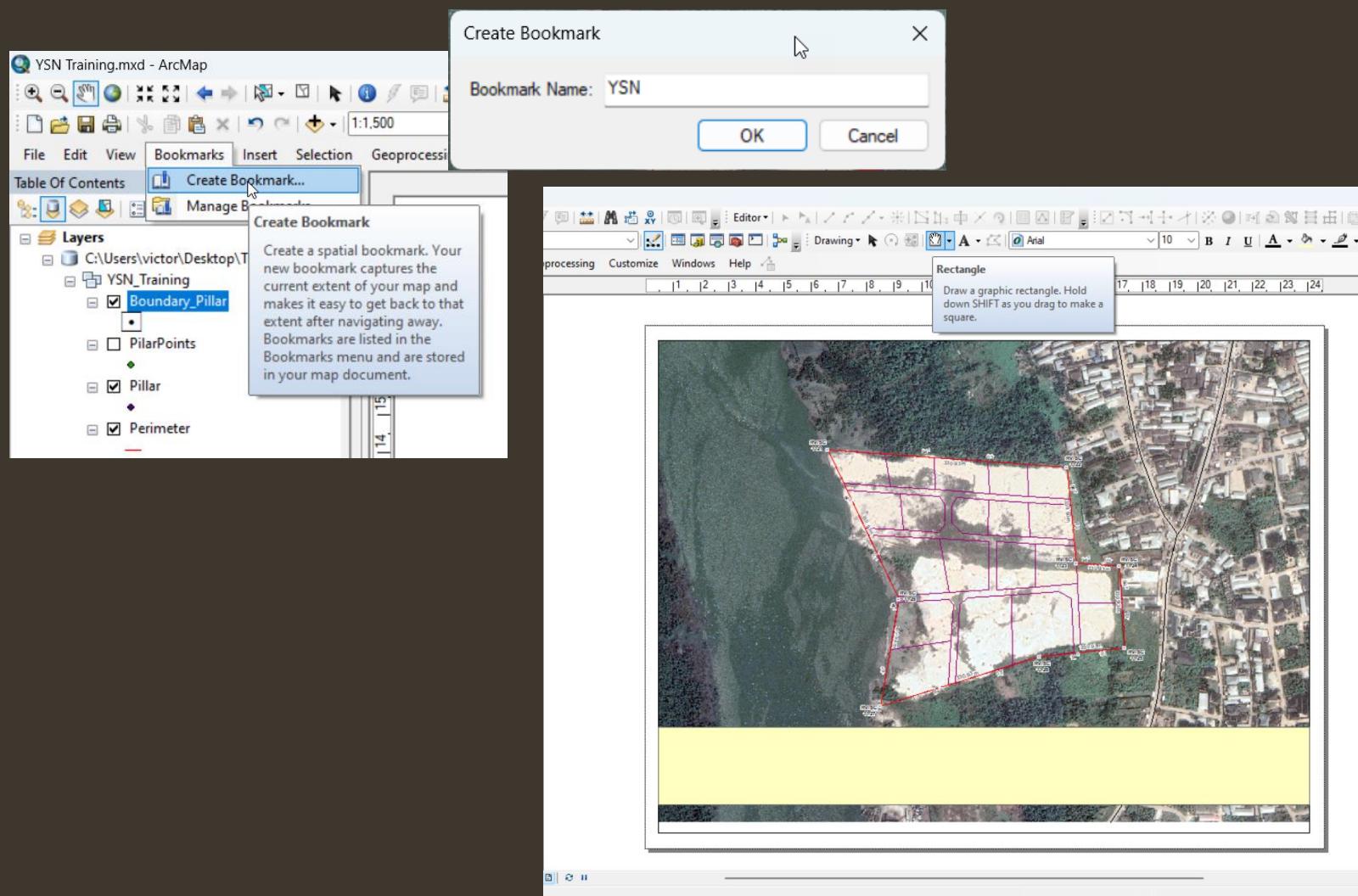


Data Visualization

Setting up your Print page



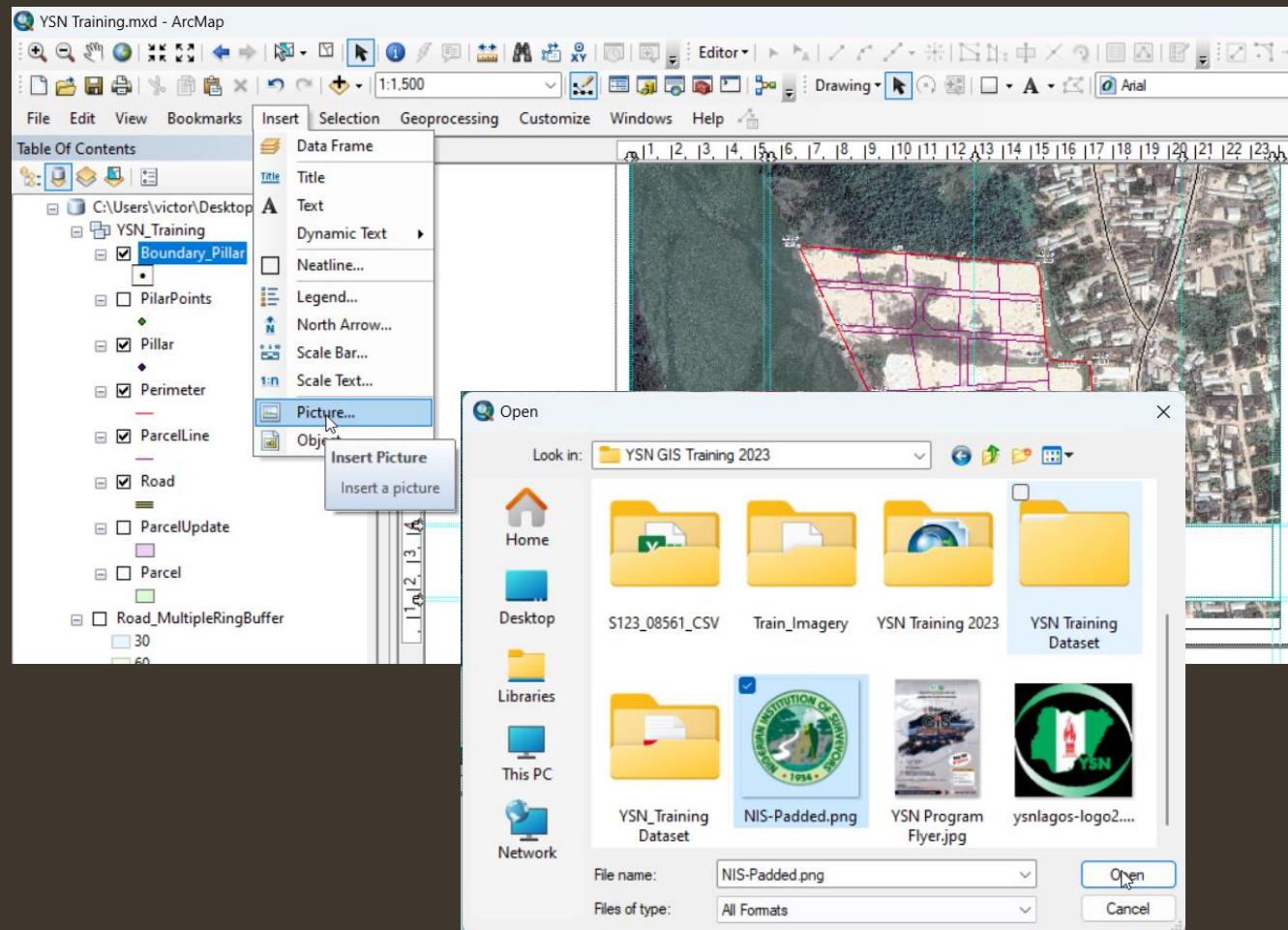
- Position your map to taste
- Select Bookmark from the Menu Toolbar
- Type YSN
- *NB. Your Map Scale should be 1:1500*



- In the Draw pane select the Rectangle Icon
- Adjust the edges appropriately

Data Visualization

Importing your Logo



- Select Insert from the Menu Toolbar
- Select Picture to add the YSN, NIS Logo
- *NB. Your Use the insert button to add, Scale Bar, Scale Text, North arrow, NeatLine*

Data Visualization

Final map

